EVALUATION IN HIGHER EDUCATION

A Report of the Seminars on Examination Reform organised by the University Grants Commission under the leadership of Dr. Benjamin S. Bloom.

UNIVERSITY GRANTS COMMISSION
NEW DELHI
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PREFACE

The University Education Commission appointed by the Government of India in 1948 to report on the problems and needs of university education in India have stated as their view that if they had to suggest one single reform in university education it would be that of examination. It is one of the statutory functions of the University Grants Commission to consider problems relating to examinations and to bring about necessary improvements in the system. The University Grants Commission, therefore, appointed in 1958 a committee of persons with special knowledge and interests in this field to make a thorough study of the problems involved and propose remedial action. Meanwhile Dr. Benjamin S. Bloom, of the University of Chicago who was then engaged in directing 'workshops' on evaluation in secondary education under the auspices of the Ministry of Education, kindly consented to organize four similar regional workshops for university teachers at the Universities of Osmania, Poona, Patna and Aligarh. The present volume is a summary of the theories and practices of evaluation discussed and worked out in these seminars.

Dr. Bloom points out that the first and, in some ways the most appalling, phenomenon he encountered was the high rate of failure in the examinations of Indian universities. He locates the cause of such failures in the selection or admission procedures in the universities, in the types of learning experiences provided, and in the types of examinations used to determine success and failure. It would thus appear that the problem of reform is really a complex one involving the whole of the teaching-learning process. In fact one is tempted to say that the problem of examinations would be largely solved if we could somehow improve the quality and methods of teaching and the responses and learning habits of students.

This volume will high-light some of the deficiences in our present system of examinations. Remedial measures have also been proposed. More important, a careful study of the report will show how the specific objectives of teaching in various fields of knowledge could be formulated and how test materials could be prepared to assess the extent to which the objectives of teaching have been fulfilled.

We expect soon to be able to publish the report of the Commission's Committee on reform in examination. We hope that this report will form a companion volume to the present publication.

I should like to take this opportunity to thank Dr. Bloom for the thought-provoking leadership that he provided at the regional seminars. I hope that this report will stimulate administrators and teachers in our universities to bring about changes in the life and work of our universities and colleges that will lead to improvements in the teaching-learning-testing practices in them.

SAMUEL MATHAI

New Delhi
June 23, 1961

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SOME OBSERVATIONS ON EXAMINATIONS IN INDIA

The observer from abroad has great difficulty in securing a comprehensive picture of the University examination system in India. The system is so complex, so far reaching in its effects, and so loosely controlled that one has a real problem in determining just where to begin one's observations or in determining when one has completed all the necessary observations.

During the past ten years I have had the pleasure of discussing the theory and practice of educational evaluation with a large number of Indian educational visitors to my office at the University of Chicago. A few of these visitors came with open notebooks in which several blank pages had been set aside for *Examinations—University of Chicago.* For these visitors, the notebooks closed as soon as the necessary statistics and quantities had been extracted from me—how long is each examination, how many examiners, how much are they paid, how many students take each examination, how many days are required to value the papers, etc.? These visitors and the writer ended the interview with about the same level of ignorance that we had at the start of the interview.

However, the majority of Indian visitors to the University of Chicago Examiner's Office asked deep and penetrating questions. They wanted to know how the examination system worked but they also wanted to know the assumptions about students and learning on which the system was based. They wanted to understand the role of the teacher in the examining and the sources of direction and control. In these discussions, I was fortunate when I could get my visitors to answer the same questions with regard to the Indian Universities. Frequently, we would end our discussions by a point for point comparison of the examining in a specific Indian University and the University of Chicago.

It was from this background and from a systematic reading of articles and reports on education and examining in India that I began when the University Grants Commission invited me to make some observations on the University examinations as well as recommendations for so-called "Examination Reform."

One of the first and, in some ways, the most appalling phenomena I encountered in varied readings, statistical reports, and in comments from educationists was the high rate of failure in the University examinations. Failure rates as high as 50, 60 and even 70 per cent were reported for the Bachelor's examination. It is hard to understand how an educational system can function effectively if its failure rate is so high. One would look to the cause of such failure (*a*) in the selection or admission procedures of the Universities, (*b*) in the types of learning experiences provided by the Universities and (*c*) in the type of examinations used to determine success and failure. Much of my inquiry had to do with these three points, since I was convinced that this high rate of failure could only be accounted for by serious flaws at some points in the University system.

SELECTION AND ADMISSION

Indian Universities are crowded with much of the instruction reduced to lectures to large groups of students. If half of the students are really not adequate to the learning task, then the elimination of such students at an early point in their University career would make it possible for the teachers to do a more effective job with the remaining students. If, on the other hand, the students are really capable, there is no excuse for failing so many after they have in effect completed the programme of instruction. One is forced to conclude that something is defective if failures continue at this very high rate.

Another fact I encountered very early was the number of students in the Universities. In 1957 there were approximately three-fourths of a million students in the higher educational institutions of India. This constitutes about two per cent of the age group 17-20 in India. In various European nations the proportion of the age group in higher education is about 5 per cent while in the USSR and in the US it is much higher. In the US about 16 per cent of the age group 18-22 are in higher educational institutions. If its most able 2 per cent of the age group were in the Universities, India would have the most capable University students of any of the highly developed nations in the world. Whether, in fact, this is true or not is a matter of conjecture. Although students are generally admitted to the Universities on the basis of performance in the Matriculation Examinations, University faculty members seem convinced that many of the students are not capable of University work. In only a few colleges have tests of scholastic aptitude or intelligence been used in making selection. Much must still be learned about who is admitted and who is refused admission to the Universities. Is it true, as some contend, that only students with

highly developed memories or verbal facility are admitted, while students who are intelligent, creative and able to think for themselves are less frequently admitted? I could find little evidence on this question, since the use of criteria, other than the Matriculation Examination, is only being tentatively explored at a few Universities with no results as yet reported.

QUESTION PAPERS

I was able to secure a large sample of examination papers and to study these in great detail. All of the questions were of the essay type and the student was directed to answer only about two-thirds of the questions listed on each paper. While some of the questions gave the students the opportunity to do more than simply state the remembered information on the topic, the majority of the questions require the student only to remember specific details. A study by Dr. Desai of Baroda University suggests that only a few students elect to choose the questions which require complex thinking or problem solving while the majority elect to answer those questions which require memorised detailed information.

The comparison of examination papers over several years revealed the extent to which similar questions recurred over the years. It was quite clear from the sample of papers I studied that one should be able to predict at least 50 per cent of the questions which might be asked in any given year. I was also able to understand why some students claimed the most unfair questions in an examination are those that had also occurred in the previous year. In this sample of question papers one could predict with great accuracy that the 1956 questions would not appear in the 1957 question papers. The question papers thus make it clear to the students what *not to study* as well as what *must* be studied. The student who studies more than two-thirds of a subject is likely to be studying more than he needs for a particular examination.

The form of the questions and the pattern of recurrence of questions over the years should lead students to a form of study and preparation which, from the viewpoint of learning, leaves much to be desired. At a later part in this section I will describe my efforts to determine the methods of study reported by University students.

On the basis of research on examinations * done in various countries one could expect that these examinations would have a very low level of reliability. The sample of questions on a particular question paper is so

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*See footnote on page 16.

small that a student might be expected to have greatly different marks on two question papers in the same subject. On the basis of this type of research one might expect that if two question papers were drawn up and given to the same candidates on successive days, some students who fail in one would pass in the other and one might even expect some students with a first class in one paper to receive a third class or even failure in the other. Only a few studies of reliability of examinations have been carried on in India. These few, in general, corroborate the findings obtained in other countries and suggest that a type of Russian roulette is being played with individuals' careers. One hesitates to use such strong language with such meagre empirical evidence available on the reliability of the Indian University examinations. Perhaps the strength of this language may stimulate the gathering of more information to determine whether the evidence accumulated over the past 40 years in other countries is also found to be applicable to India.

The examinations are given in such large numbers, especially at a Bachelor's level, that many examiners must be used. The type of questions are such that one would expect different markers to judge the same paper differently. Here again studies made in other countries have found widely different marks assigned to the same paper by different readers or judges. The student who has failed in the eyes of one reader may be a second or first class in the eyes of another reader. If each paper is marked independently by at least two persons who have been carefully trained, the errors in marks attributable to subjectivity of judgments may be markedly reduced. This, however, does not appear to be the case in India and it is likely that fewer than 10 per cent of the papers are checked by more than one reader. Here again more empirical evidence is necessary to determine whether the subjectivity of grading for this type of examination is as true in India as it has been found to be in other countries during the past four decades.

The combination of low reliability in the sample of questions used and high subjectivity in marking procedures is such as to give great weight to chance and whim in determining an individual's fate. The exact amount of error attributable to these two factors needs to be studied in great detail in India. My own calculations based on estimates of reliability and objectivity reported by Salamut Ullah, Hartog, and Starch lead me to the conclusion that if 20% of marks on a paper are fail at least 4% of the students may fail through chance factors on such a question paper. The usual rule is that a student who fails on one paper fails the entire examination. It then follows that if a group of students take 8 papers as high as 32% of the students may fail on some one of the 8 papers

by chance. This figure may be too high or low. However there is no doubt that chance plays a major role in the determination of the fate of an Indian student.

The comparison of papers over several years reveals a highly stereotyped character to the question. Originality in setting questions is not highly prized. The amount paid for setting questions suggests that it is not expected the question paper setter will work for many days on this task. (This point will be further treated in a later part of this chapter.)

SYLLABI

I was able to secure syllabi for 24 Universities. While there were some differences from University to University the casual reader is more impressed with the similarities rather than with the differences. Although the syllabus does not clearly state this, the teacher, the student and even the examiner all appear to assume that the coverage or sampling of content is what is to be learned. The detailed list of topics to be covered seems to convince all concerned that education is to be equated with some detailed information on each of the topics listed. On reflection it is possible to recognize, that knowledge of information is only one of many different types of learnings to be developed by the student. However, the effect of the syllabus (which does not seek to correct misconception about what learning is to take place) and the pressure of time and numbers of students makes information on each topic the major purpose of instruction for the teacher, the major objective emphasized by the examiner, and the cramming of such information the major task undertaken by the student.

The syllabus seems a very inadequate tool for giving direction to the learning process. While it could be the means of promoting independent learning on the part of the student, it apparently serves to keep the student dependent on the teacher for his learning. It encourages the student to believe that if he remembers an accurate version of the teacher's lecture notes on each of the topics in the syllabus he has mastered the subject.

In some of the syllabi the references cited were relatively ancient, even in fields which have changed markedly in the past two decades. It is evident that syllabi are not changed rapidly enough to keep pace with the significant changes taking place in the subject fields.

One other point to be emphasized in connection with the syllabi is that the organic unity of many subjects seems to be frequently violated by the way in which the subject is outlined. The relationships among ideas,

their relationships with major views and theories, and their relationship to current problems and phenomena are, in many syllabi, obscured by the form of organization. (This point will be referred to again in the discussion of the methods of study reported by students.)

MEETINGS WITH FACULTY MEMBERS

In a separate section I will discuss in some detail the nature of the faculty seminars and the types of evaluation instruments constructed by the seminar participants. Here I will confine myself to the general impressions about examining and teaching which I was able to get from discussions with the approximately 100 University professors who attended the seminars.

With almost no clear exception, every faculty member regards examination reform as desirable or necessary. Some seek change and would eagerly bring about certain changes they regard as important while others, with perhaps less enthusiasm, regard change in the examining system as inevitable. Some would prefer slight changes in rules and procedures while others would go so far as to completely eliminate the present University examinations. The point of all this is that the stage is set for examination reform. The question is not whether there should be examination reform or not, but in which of several directions the changes should take place.

If I were to attempt to infer some concensus from the seminars it would be somewhat as follows. Not every participant would agree with each point but I believe the majority would. It should be noted that not every participant was given or took the opportunity to express himself on each point. With these qualifications, I believe the seminar participants held the following views:

A — Periodical tests given during the year by the teacher should count as part of the final work assigned to the student. The exact weightage to be given to this internal assessment would be relatively small at first with increasing weightage to be given as increased confidence is established in the faculty's internal assessment procedures.

B — Some consideration must be given to methods of internal assessment which will limit abuses and favouritism on the part of both teachers and students. (Almost every participant was greatly concerned about this point.)

C — In so far as possible the internal assessment procedures should not place an unduly heavy extra burden on the teacher.

D — Where there is no great premium for holding a subject in mind for

two or three years, instalment examinations may be held to enable a student to take the examination over a particular subject at the end of the year in which he studied it. (The agreement on this was not as high as on other points.)

E — In so far as possible the examinations should measure the significant learning in a subject rather than hold the student for memory work on the less significant details of the subject.

F — The examinations should increasingly measure the major outcomes of instruction and the sequential or comprehensive learning achieved by the student.

G — If examinations can be used to develop better methods of study and increased independent learning by the student, this would be a major gain to be sought.

H — If students are not really capable of University work by reason of lack of ability or motivation, they should be identified as early as possible so as to reduce the burden on the University and the time and expenses on the student and his parents. (Here the participants were dubious about the possibility of developing sufficiently precise means of identifying such students.)

I — There should be a greater variety of evaluation procedures used in both internal and external assessment.

J — The chance elements in present examination procedures should be reduced and the student should be expected to learn the entire subject rather than just those portions which may be emphasized by a student who is "cutting corners" in his preparation.

K — The proportion of present failure is too high but standards should not be reduced. If anything, the present level of performance required for a pass is too low.

L— Change in the examination system must not be too slow, but at the same time should not be so fast as to dislocate University education in India.

M— The entire examination system must be seen in relation to the history and present social and economic problems of India. All the ills of education in India cannot be attributed to the examination system. The resources of the Universities, the crowding of classes, inadequate libraries, limited physical amenities, prospects for employment of the graduate, etc.

must all be taken into consideration when considering educational reform—the examination problem is only one of many.

Quite frequently the seminar participants were impelled to speak with great feeling about the social and economic problems of the larger society and the limiting conditions in the Universities. Some were certain that the problems of examination reform were of only minor significance in comparison to the other problems and it was with great reluctance that they returned to the consideration of examinations and their improvement. Some went so far as to insist that if all other conditions were improved, the problem of examination reform would be extremely simple. While I could sympathize with this point of view it did appear that even in colleges which have almost ideal conditions of pupil-teacher ratio, physical amenities, careful selection procedure, adequate libraries, etc. the examination problem and its consequences are almost as great as in those colleges which have the least favourable circumstances. This is not to say that the conditions should not be improved as rapidly as possible. The point is that the examination system breeds a great many educational problems which cannot be eliminated unless the system is greatly improved.

Many of the seminar participants have been question paper setters, moderators, chief examiners, and assistant examiners. In discussion with these participants I was able to check certain impressions I had about the present examinations.

It seems clear that setting a question paper is not a time consuming job. There were many anecdotes about the setting of a question paper during a train ride from one part of India to another. Some mentioned the setting of a question paper as the work of an evening—a short time before it was due. They had difficulty in understanding how more time could be used in setting a paper and my description of examiners devoting three to six months for the careful preparation of a comprehensive examination was met with amazement.

The necessary materials for constructing an examination are the syllabus and the old question papers (the same tools as the student uses in his preparation for the examination). The problem of constructing a question paper seems to be one of asking a question which is new but as much like previous questions as possible. It is evident that really original questions and problems that are fundamentally new are not highly prized. In fact, such questions might be eliminated by the moderators or vigorously rejected by students as unfair, too difficult, or not directly covered by the syllabus or lecture notes.

I sought to determine whether anyone was really in control over the examinations. It was clear to me that the paper setter was severely limited by the syllabus and the old question papers. The moderators also exercise little control over the examination since they are limited by the syllabus and what they believe the "traffic will bear" (in this case, the students taking the examinations). Even individuals titled 'Controller of Examinations' (or Registrar in Charge of Examinations) confessed that they were limited by the rules and regulations and that the only control they have is over printing, security, and the conditions under which examinations are taken and marked. Even Boards of Study and other ruling bodies in the Universities apparently have little control over examinations.

It seems to this observer that the real control over examinations is in a body of traditions and practices which have accumulated over the years. The examinations do much to control the behaviour, thoughts, and attitudes of teachers, students and others in the Universities, but no living individual or group, however powerful and persuasive, is really in control over the situation. *The past rather than the present is the determining force in the examinations of India.*

It has been impossible for me to sit with examiners as they appraised particular responses to the question papers. However, members of the different seminars have described the process. Model answers are formulated by the chief examiners and these are made available to the assistant examiners. A small sample of papers and their marks are submitted to the chief examiner who suggests modifications to the different assistant examiners. With few exceptions, subsequent papers are not checked by the chief examiners. Thus the majority of papers are valued by only a single person. Under these conditions it is quite possible for large elements of subjectivity to enter in the appraisal of particular papers. Boredom, fatigue, irritation, desire to get the job done quickly, and even variation in the competence of the examiners may markedly affect the appraisal of the papers. The controls intended to minimize subjectivity in the marking of essay responses found in some U.K. Universities or in our own University of Chicago examining are not present here. Such controls are maintained by having all papers read by two readers independently with all discrepancies over a particular level subjected to further checks. Such controls are particularly necessary where major decisions about an individual are based on a single examination. These controls may be somewhat relaxed if a series of evaluations are made over a period of time such that the final mark is based on a number of independent judgments made by the same or different persons.

The seminar participants also pointed out that a student would frequently fail an entire examination if he failed in one paper. Failure in one paper may occur because of errors in the judgment of an examiner, such errors are cumulative in this method of combining results. It is not difficult to understand the reason for the excessively large proportion of failures in the light of such procedures.

One other point was made by the seminar participants. If a student fails in one paper he is usually expected to retake the entire examination even though he may have been very high in the other papers. Many illustrations were cited of students retaking the examination several times and each time failing in a different paper—now English, then Mathematics, then Science, etc. It is difficult to comprehend the reason for this regulation since theoretically the original failure in one subject has no bearing on the student's marks in another subject. I understand that under some conditions the examination may be compartmentalized so that failure in one paper requires only the removal of that particular failure rather than the retaking of the entire examination.

Given the present examinations which require a great deal of memory work, it is easy to understand why some students find it difficult to build up a permanent level of competence in all subjects. On retaking the examination they repair the gap in one subject only to reveal gaps in other subjects. There is considerable evidence from research on retention of learning that memorized information is not very permanent. Since the memory load for the examinations is a very heavy one, the examinations give a great premium to those students with a high level of memory aptitude or who spend a great deal of time in cramming.

INTERVIEWS WITH UNIVERSITY STUDENTS

Education is primarily concerned with human behaviour. If one considers education from a theoretical viewpoint alone he is likely to overlook the effects of the education system on the activities, thinking, and feelings of the major participants in the educational enterprise—the teachers and students. Examinations which form a major element in the educational enterprise may be considered from the purely technical viewpoint of accuracy of measurement, but such a viewpoint may miss the powerful effect of the examinations on the ways in which students learn, their attitudes toward the learning process, and their feelings about their performance in the examinations.

In order to secure some information on the effect of examinations on

students, arrangements were made for me to meet with groups of students in six different Universities. Altogether, it was possible for me to have group interviews with about 200 students. Approximately one-third of these students were women. The majority of students were in their final year of the Bachelor's programme while about one-fifth were at the Master's level. The group included arts, professional, and technical students.

I had already gained some impression about the effects of the examinations on students from the faculty members in the seminars. However, I did want to get some information about this directly from the students. In these interviews I sought to treat the students as observers of their own activities. I was not interested in their impressions about other students or even their likes and dislikes about the examinations.

Perhaps the most important thing I wished to learn was the amount of study students do during the regular year and the amount and kind of preparation they make for examinations. On the basis of these interviews I gained the impression that during the year the typical student spends less than an hour a day on study outside of class attendance. (It is evident that girls spend more time in study than boys, and that science and technical students spend more time in study than do arts students.) Students do not see much need for additional study time during the regular year since the major emphasis is on getting good notes from the lectures and checking these notes against a standard textbook. The students are also convinced that they will be held for a memorized version of the subject and that the attempt to learn this material too early is wasted since it can't be retained until examination time. There were, of course, exceptions to this but these formed a relatively small minority (perhaps as high as 10 per cent).

It is not safe to generalize on this point about other countries or Universities. However, in many of the better Universities in the US the student is expected to devote 2 or 3 hours of study for each hour of class time. Clearly, all students do not study this amount—some do more while many do less. The reading assignments, problems to be solved, and material to be mastered are such that the student has difficulty if he does not put in 30 or more hours each week in study. Reports from the USSR suggest that an even heavier burden is expected of the University student there than in the US or the UK.

The US student spends about 15 to 18 hours a week *in class* which is about the same as the Indian student. In contrast to the 5 to 7 hours a week devoted to study *outside of class* by the Indian student, the US

student is expected to devote (and generally does) 30 or more hours a week of study *outside of class.*

The accuracy of these figures is open to question and I am certain that more detailed investigations would be necessary to determine these data with more precision in the different Universities and countries. (Many Indian educationists with whom I have discussed this point have been surprised that students claim to have studied as much as an hour a day, while some US educators have questioned these figures for the US. Some claiming it may be as low as 20 hours per week, while others insist that 40 hours per week is more appropriate). Schrader and Frederikson (1951) report a median of 20 hours per week for 25 American colleges. In any case, the contrast is still of the order of *three to one* to perhaps *five to one.*

Personally, I do not believe that students can learn a complex University subject without devoting time to it. University learning is a full time activity and should, in my view, occupy as much of the students' time as a regular occupation—40-50 hours per week. Less time than that must mean that the work is not of University standard or that the student is gaining only a superficial understanding of the subject.

While I have been primarily concerned about the complexity of the learning and the work required, it seems to me that some of the disciplinary problems in Indian Universities must arise from the sheer amount of time available to the student for "non-intellectual pursuits". On a sheer probability basis the student who spends only 20 hours a week in intellectual activity is going to get into more "non-intellectual" activity than the student who spends 40 hours a week in intellectual activity. However, this should not be interpreted as a plea for mere filling of time for disciplinary reasons. The point is that time is required for significant educational development in the student.

The pattern of preparation for examinations, as reported by students, was typically that the student plans to devote major time to study for 3 or 4 months. However, many students found it difficult to get down to serious study at the time they had originally planned and after some tentative starts found themselves devoting about six weeks to intensive preparation for the examinations. During this intensive period the student might spend 5 to 10 hours a day in study. Although most of the students had prepared a time-table for their examination preparation they usually altered this table in a downward direction. Most students found themselves with a tremendous amount of material to be covered in less time than they had originally planned.

At this point the students are faced with the necessity of "cutting corners" and must find some method which will enable them to do less than full preparation. Students typically claimed that they carefully studied one-half to three-fourths of the subject. They gave most careful attention to those topics emphasized by the lecturers or those questions which occurred repeatedly in the examination papers over a 5 to 10 year period. They gave relatively little attention to those topics or questions which had occurred in the previous year's question papers. Some mention was made of pamphlets available on the market but most of the students expressed the view that these are of little real value.

In this intensive period of study the students attempt to learn topic by topic. Only rarely does the student find it possible to study the interrelationships among the ideas and topics, the relationships between the ideas and broader theories or viewpoints, or the applications and implications of the ideas for new problems or current happenings in the field. Study is for the student a review of what has been presented in the lectures or textbooks not a relating and reorganizing of the whole subject.

The students were eager to cite a large number of examples of students who studied regularly but did poorly in examinations. They have rationalised that the only effective method of preparation is the intensive cramming of subject matter as near examination time as practicable. They are convinced that more regular study procedures may be useful for understanding the subject but are not appropriate to examination passing. Thus, the students do make distinctions between mastery of a subject and mastery of examinations—one is separable from the other. Since examinations are the major bases on which the rewards of the University and ultimately the prizes of the society are awarded, they believe the person with good sense must concentrate on the examinations. In spite of this, the students view the examinations as coercive instruments which require them to learn much subject matter detail, not because of their significance in the understanding or mastery of the subject, but because these are likely to be stressed in the examinations.

The taking of the examinations is viewed as a dreaded experience, with great anxiety and emotional tension being developed by the majority of students. Luck and chance are regarded as powerful factors in determining the questions asked and the marks received.

Part of this arises from the fact that the examination is the sole basis for assigning marks and all rests on the single examination performance. Part of this anxiety stems from the lack of experience with examinations

as a regular and important part of their learning activity. Part arises also from their feeling that they never know exactly where they stand or what their level of competence or mastery is at various times during the programme of study. Repeatedly, the students interviewed stressed their inability to determine how well they were progressing during the year and their inability to determine how well they were performing in the examinations until the final marks were received. Modern learning theory stresses the need for evidence of progress being available to the student as a basis for motivation and as a basis for the student to take appropriate steps to maintain or improve his mastery.

Some students were eager to inform me of the methods used when they do not know the answer to a question in an examination. Some invented quotations and ascribed them to noted men in the field, because they were sure the name would carry a ring of authority and no examiner could be certain, without thorough research, that the authority cited had not said or written it. Others have developed techniques for writing vaguely so that some credit might be given by a puzzled examiner. Still others said they never omitted a required question, they would write something that might be seen as relevant. The point to be made is not whether the techniques actually work or not, it is that students think in terms of outwitting an opponent—the examiner.

All these observations may be summarized in very brief form. An examination system has been created which has a powerful effect on all the students and teachers who come in contact with it. It has reduced learning to a part-time activity, teaching to the coverage of particular material, and education to a relatively drab and meaningless activity. This same system can, if improved, restore learning and teaching to the creative and powerful force it can and must be in the India that is coming to be.

A PROGRAMME OF ACTION ON EXAMINATION IMPROVEMENT

The external examinations have been a powerful force in the Indian educational system for insuring minimum standards. They have enabled the Universities to expand greatly while still maintaining some minimum requirements. Any programme of change must recognize the force of these examinations and find some way of improving rather than eliminating them. They are so intricately interwoven with the educational and social pattern that change must be a gradual one rather than a sudden substitution of one system of examinations for another.

Perhaps the major criticism which may be made of the examinations is that they do not raise the standard of University education as high as is required by the rapidly changing conditions in the country. What was an appropriate minimum standard three or four decades ago is not sufficiently high today and will be completely inadequate in the near future.

Some changes have already been made in the examinations, more will be needed in the near future to keep pace with the requirements of a developing University system. The University Education Commission's Report in 1948 stressed the need for examination reform and outlined some of the directions it should take. While few of the examination changes it proposed have actually been implemented during the past ten years, the recommendations are still sound and appropriate. Many of the steps proposed here are in harmony with the Report, others go beyond it. Probably the major difference between 1948 and 1958 is the extent to which University teachers and administrators are aware of the problem and are determined to improve the situation.

RESEARCH ON EXAMINATIONS

1.. The present examinations have been constructed in a particular pattern which has not changed for many decades. Studies of reliability and objectivity of examinations made by Hartog in England, Starch and Elliott and others in the United States, and Salamut Ullah in India have raised

considerable doubts about the *accuracy of this pattern of examination question.** It is evident that the research literature and technical developments in examining elsewhere in the world have not as yet been related to the examinations of India.

Unless examinations have appropriate levels of reliability and objectivity, decisions made about the students through use of such examinations are of dubious merit. When the sole basis for deciding about an individual's future is single examination, it is especially necessary that the errors of measurement be kept within a safe margin.

No systematic provision is made for continuing research on the present examinations. Although the number of students taking examinations each year has grown to enormous proportions, little effort is made to study the soundness of the present procedures. What is the level of reliability of these examinations and by what techniques can it be improved? What is the present level of error attributable to subjectivity on the part of the examiner and by what techniques can this error be reduced? What are the soundest procedures for combining marks from internal and external assessment procedures? What is the relationship between the student's performances in various papers and how should the result be combined? What is the relationship between the student's examination marks and the teacher's judgment of his competence? What kind of examination questions do the students elect to answer and what is the nature of the questions they avoid? These and many other questions should be continually raised and answered about the present examinations.

As a minimal recommendation, it is suggested that *each University permanently employ a Psychometrician to study the examination results by modern psychometric procedures and to recommend steps for improving the examinations and their utilization.*

**See* Salamut Ullah, *Examinations in India: Their Defects and Remedies* (Calcutta: Orient Longmans Ltd., 1951) pp. 19ff; Philip J. Hartog and E. C. Rhodes, *An Examination of Examinations* (London: Macmillan, 1935); and three articles by D. Starch and E. C. Elliott in *School Review*, Vol. 20 (1912): 442-57, and Vol. 21 (1913) 254-59 and 676-81. An important summary of studies of the reliability of the essay examination is to be found in Walter S. Monroe, Editor, *Encyclopaedia of Education Research* (Revised Edition; New York: Macmillan, 1950) pp. 407-409 and bibliography following.

The examinations play such a major role in the lives of the Indian students that they are the centre of interest of a great many people. Much of the discussions about examinations and many of the writings on this subject seem to be at the level of public debate with little in the way of basic data or technical information entering into the considerations. Modern psychometric methods can be used to establish the basic data on the present examinations and this in turn can be used for improving policy and procedures even within the existing system.

EXAMINATIONS AND EDUCATIONAL PURPOSE

2. However, such a minimal step will not get at the heart of the problem. Improving the precision and accuracy of the present examinations will not improve the standards of education in the Universities.

The examinations are a powerful force in determining what is learned and what is taught. They influence students' methods of study and even students' attitudes towards education. They also influence the faculties' methods of teaching and their views about education. Improving only the accuracy of the present examinations would give a misplaced confidence in the examinations and perpetuate some of the existing ills in the University education.

At present the examinations stress only *information* about the subject. The faculties do little more than to teach the information about the subject, and the students learn only the information about a subject.

The seminars with faculty members has made it clear that the teachers want a great deal more. They want the students to be able to think with the subject. They want the students to develop skill in the fundamental methods and procedures of the subject. They want the students to develop appropriate interests and attitudes. They want the students to develop skill in communicating their ideas to others, and they want the students to develop their ability to learn not only while in school, but throughout life. These are a few of the objectives of education identified by the University Professors of India. These objectives are not fundamentally different from the purposes of learning stated by the faculties in Universities of other countries*

It is clear that such objectives cannot be achieved if the examinations

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* See goals of higher education in President's Commission on Higher Education, 1947.

continue in the same form as they are now—since students will study for that which they expect to be examined on and faculty members will continue to teach for the learning which is *required* by the examinations. On the other hand, fundamental changes in the examinations cannot be made unless the students are adequately prepared for the kinds of thinking and reasoning required. Educational objectives, teaching methods, and examination procedures are all so inter-related that one cannot change without affecting the others. For a long time, the examination procedures have been so powerful as to limit the educational objectives to what the examinations are able to measure. In turn the teaching and learning methods have been held back by the examinations.

Much of the difficulty appears to stem from the limitations of the examiners. If the examiner's art is limited to asking questions of information, then the whole educational system seems to centre on this one objective of learning. As one seminar participant put it, "It should be easier to coach several hundred examiners on the improvement of examinations than to coach a million boys and girls to answer the present type of examination questions."

If the faculties can clearly state the kinds of educational objectives which are important in present day India, and can develop methods of helping students learn to achieve these objectives, examinations can be devised which will test for these objectives.

Thus, *the shift can be made from the examinations as the controlling force in University education to the purposes of education as the guides to learning and examining.* Such a shift would make the examinations the means rather than the ends of education. This change in viewpoint would also enable teachers to become more creative in their teaching and students more active and enthusiastic in their learning. This basic shift in the role of examinations is the major recommendation in this report.

SPECIFIC FEATURES

In addition to the emphasis on purpose in education some of the specific additional features recommended are briefly described in the following:

3. The students' final marks should be based on internal assessments by the teachers and on external examinations. The weightage given to the internal assessments may be about 20% initially but as confidence is established in the internal assessment it should be increased to at least 50% preferably within a 5-7 year period. The teacher must be aided

in his internal assessment by the availability of a pool of carefully developed evaluation procedures which he may use as he desires. He should also be aided by the establishment of appropriate procedures which will minimize bias and error in the internal assessment.

The right type of internal assessment should help the student develop better methods of study and improved attitudes towards learning. Proper use of internal evaluations should help the student determine his progress towards the fundamental objectives of the learning. In the student's first year in the University he might be given periodical tests and evaluations at least monthly. Perhaps in his second year these may be bi-monthly and in his third year they may be given less frequently. Here it is suggested that the proper use of evaluation can do much to promote better learning habits.

4. The syllabi should be revised to make clear to the students the type of competence he is expected to develop and on which he will be examined. The syllabi should encourage independent thinking and study in the student and should aid him by defining not only the minimum requirements but also the fullest possibilities in the learning.

5. Mastery of a subject and mastery of the examinations should be seen by the students as synonymous. If the objectives of learning a subject are clear and the evaluation procedures are appropriate to the objectives this should do much to emphasize to the student what mastery of the subject involves. If evaluation procedures are varied and include many different techniques they are likely to be less artificial and more naturally related to the learning process. Some of the evaluation methods may include written and oral examinations, essay and objective questions, closed book and open book test problems, term papers and reports on work in the laboratory, field, or library, products the student has made, and observations of the student in complex situations (laboratory, field, or in class).

If evaluation procedures are used as a natural part of the learning situation they will be seen by the students as helpful in organizing his thoughts and in giving him a sound basis for determining how well he is progressing and how he can improve in his work. Under such conditions the anxiety now attached to the examination can be markedly reduced.

6. If more complex types of learning are to be expected of students, then a greater variety of learning experiences must be made available to students than simply listening to a series of lecture notes. Interaction between students and teachers must increasingly be a two-way form of communication. Students must be enabled to explore the real phenomena of the

subject and they must learn to think with the subject. Students must increasingly have opportunities to read the primary sources in the field. Students must be given opportunities to engage in learning that is exciting and stimulating and they must have adequate opportunities to engage in individual work that is both creative and demanding.

Teachers should be aided in this by frequent opportunities to discuss educational problems with their colleagues, by cooperative development of teaching guides and source books on learning experiences, by the availability of adequate libraries or collections of readings which the student can use, and by teacher-student ratios which permit the teacher to at least learn the name of each student in his class.

7. As the student advances in his studies, the evaluation methods should increasingly shift from problems and questions which emphasize the student role to those types of activities, problems, and projects which emphasize the professional, scholar, or research worker's role. Teaching, learning, and evaluation should all collaborate to help the student to achieve his full potentiality and to become a contributing member of the adult society. The evaluation procedures should have a sequential and cumulative effect. Each new internal or external assessment procedure should require the cumulative learning which should have taken place up to that point in time. This may mean that some of the details used in the learning experiences may be less important while the larger concepts, principles, and methods may become more central.

Learning that is not sequential over more than a year should be examined at the end of the year and the student should not be held for the details of the learning on subsequent examinations. Thus, the external examinations should be given in instalments when the nature of the learning permits this.

8. The high rate of failures on the University examinations may be attributed to many different factors, including the examinations that are used. Undoubtedly one source of this failure rate (which is one of the highest in the world) is that the Universities admit many students who are not intellectually capable of the work required or who are not sufficiently motivated to learn.

It is hard on economic or social grounds to justify giving a place in the Universities to a student whose failure could be predicted with a high level of certainty before he entered the University. This, under present conditions, denies a place to some other student with greater promise. With increases in the number of secondary students will come

more and more rapid increases in the number of university students. It is likely that the external circumstances will bring greater and greater pressure for more selective admission to the Universities and for a continual policy of dropping those students who demonstrate that they are unable to profit from a higher education.

Scholastic aptitude tests have been developed to a high degree in many other countries. Such tests could form a valuable supplement to present achievement examinations for making decisions about the relative promise of applicants for admission to the Universities. It is possible for Indian workers to refer to the rather voluminous literature in the field and to profit from the experience of other countries with different types of aptitude tests.

However, finally, it will be necessary for India to develop its own aptitude tests and to experiment with them in its own schools and Universities. Such tests may be developed and tried under different conditions in an exploratory fashion. Only as they prove to be sound predictors of later achievement should they actually be used as one element in the selection procedures.

Some of this work has already started in India. It is here suggested that this work must move ahead in a more intensive way and that the efforts of the different workers in this field should be coordinated. One of the advantages in research on aptitude tests is that empirical demonstrations of their effectiveness can be made before they need be used in making decisions about students.

PROPOSED STEPS AND ORGANIZATION

There are undoubtedly many different ways in which progress could be made on the eight points suggested here. It is at this stage that the foreign consultant is at something of a disadvantage since he does not have a deep understanding of the forces and currents of thought within the educational institutions of this country. One sees them only from the exterior.

Still, looking at the organization of examination work from the vantage point of almost a quarter of a century of experience, it is possible to make a number of suggestions as to how this work can be realistically carried out.

Before making any suggestions it is well to point out some assumptions made as guides to these proposed steps.

A. It is assumed that the majority of faculty members of Indian

Universities are seriously interested in an improved form of examinations and in higher standards.

B. It is evident that University autonomy is highly cherished and that the University is the unit within which examination reform must be developed.

C. It also seems clear that University education is a national concern and that a general raising of the standards everywhere is to be sought rather than devoting the major effort to a few Universities which by reason of circumstances are most willing and able to move ahead.

D. The rate of expansion of the Universities is so great that there is some urgency in attacking the problem in the immediate future if both standards and enrolment are to rise simultaneously rather than one rise at the expense of the other.

E. The financial outlay required is not an insurmountable obstacle. In the long run the costs for evaluation should not be any greater than at present. It is quite possible that some of the practices which may be introduced by technically competent persons in the field may even result in economies in examination expenditure as well as in more rapid and accurate examination results.

The reader has probably recognized that point 1 (research on examination results) and point 8 (research on aptitude tests and selection techniques) both require the efforts of specialists highly trained in aptitude measurement and statistics. This is a type of work which can be separated from teaching and competence in the different subject fields taught in the Universities. It is proposed that each university examination department engage at least one expert in this field to do research and development work in the two areas suggested. In addition a small staff in a central office should be appointed to coordinate this work, to enable contributions from each worker to become available to all, and to provide central facilities for rapid statistical work and for the marking of objective aptitude tests.

In my travel throughout India I have met a sizeable number of well trained persons in statistics and aptitude measurement. Many of these persons are being employed in work that does not make use of their training while others are making less than full time use of their rather excellent training, usually to the Ph.D. level. While a few persons may need to be trained in the future, it is likely that the immediate needs of the Universities could be supplied from a careful inventory of the trained persons already available in this country.

The needs of the near future for statistical research equipment may

be met by sharing some of the equipment services already available in New Delhi, Calcutta and Bombay. The long term needs cannot be planned at this stage.

Points 2-7 all refer to work in which the University teachers are directly involved either as examiners or as users of evaluation procedures and results. This is a much more complex problem and requires a somewhat larger effort to coach several hundred examiners (instead of coaching a million students).

The attack on these problems requires the careful selection and formulation of educational purposes, the development of evaluation materials and instruments which can be used in both internal and external assessment, and development of learning experiences and learning material which can be effectively used by University teachers.

In order to accomplish this, I would suggest the following:

1. Create a small central planning and coordinating staff on University standards and examinations. This staff should include persons thoroughly familiar with the problems of each of the major subject areas included in the University programmes. The major tasks of this group at the beginning are (*a*) to determine the readiness of each subject field for a major advance in examining and teaching, (*b*) to help select the University personnel most ready and able to participate fully in this work and (*c*) to make the necessary arrangements for the work.

2. In each subject field they should provide for the released time of 50-70 major university teachers for about 5 months. During three months of this time the total group would participate in a seminar to plan for the objectives, syllabi, evaluation procedures and learning experiences as they should be *10 years* from now. In this seminar they should be helped by a person who has University teaching experience in the subject and who has outstanding competence as an evaluation expert in the subject.

In the other two months the group would complete some of the details of this work and would meet in brief seminars with their colleagues in this field to acquaint them with the work that has been done.

It is to be noted that the work in the different subjects may be started at different times. In the first year the five groups most ready might do their work, in the second year other groups could be invited, and perhaps by the end of the third year all major groups could be reached.

3. Each University would then determine the rate at which it would move towards the over-all plan for each subject. It is to be expected that some Universities could fully realize the plan within a five year period

while others would need at least the full ten year period to build up the necessary resources. It would be desirable for each University to submit, at three year intervals, its plan for the advances it will make during the next three years and the facilities it will need to accomplish these plans.

4. A few selected members of the different subject groups may be given additional training in evaluation theory and practice and appointed as members of a central examination unit. The central unit would contribute to the efforts in the construction of evaluation material by building pools of test materials and ideas in cooperation with university teachers, by constructing standardized tests which could be made available to the university teachers along with other types of evaluation material for use in internal assessment at the discretion of the teachers, and by aiding the university examiners in their construction of the university examinations. This group would also be available to develop other uses of evaluation materials and to help in the further development of learning experiences and learning material.

The University Examination Unit would work on specific examination tasks of the University in which it is located. It would also coordinate its efforts with the Central Examination Unit.

Almost ten years have passed since the University Education Commission's Report. Many of the changes proposed in the report have already come into existence. The suggestion for examination reform has been the most notable exception.

During this decade the enrolment in the Universities has almost tripled. The rate of increase in enrolment is not diminishing. If standards are not only to be held but even raised during the almost inevitable further expansion of the Universities it is necessary for constructive action to be taken on the examination problem at once.

There is a wide-spread interest among university teachers as well as students in examination reform. Neither teachers nor students expect their work to become easier as the result of the development of a more defensible examination system. On the contrary, all with whom I have talked expect that sound improvement of examinations will require much more effort on their part. But, in addition, all expect that a sounder evaluation system intricately related to teaching and learning will make for exciting and stimulating learning and teaching.

I am certain that if these steps can be taken it will mean the development and release of creative energies and resources in teachers and students which have been repressed for at least a half century.

Address

Delivered by Dr. C. D. DESHMUKH
Chairman, University Grants Commission,
inaugurating the *Seminar on Examinations*
at the Osmania University on 10th July 1958.

I am very glad that I have this opportunity of inaugurating the Seminar on Examinations to be held here from the 10th to 13th July. The University Grants Commission like every other responsible educational authority is convinced that reform in the field of examination has become overdue. It is also one of the statutory functions of the Commission to consider this problem and bring about necessary improvement. With this aim in view the Commission has already appointed a Committee consisting of specialists on examinations and other educationists whose recommendations in this behalf are awaited.

There has been during the last thirty years, considerable discussion in many countries on the question of reforming the examining system. As a result of this, the field of controversy has considerably narrowed and a body of basic principles acceptable to most educationists would appear to have emerged. Many programmes of improvement of the examination system are well underway in several countries.

It is, however, essential to emphasise that each country should formulate its own programme of reform. While each of these is bound to bear a family resemblance to the body of basic principles in the matter, specific steps to be taken to meet the situation in each country will necessarily differ. This is only to be expected since the educational system in different countries varies in accordance with their historical development and the values upheld by them.

There have taken place in recent times in India great changes in the political, social and economic life of the country. We stand at a significant point in the socio-economic development of Indian society. In this context purposeful planning has become imperative in every important sphere of national activity. Our educational techniques and purposes have also,

in the circumstances, to be adjusted to meet the new requirements of individual and national development.

The examination of the educational system is, therefore, part of a process of earnest assessment of national goals and targets of achievement. It would be necessary, in other words, to reconsider the purposes of education and clarify the objectives to be aimed at.

Out of this evaluation has emerged the recognition of the inter-relationships of educational experiences—learning experiences and evaluation techniques. For example, the problem of grading and of selection of pupils for further education or employment has become more acute in view of growing numbers and the growing consciousness of the implications of the democratic process and the greater facilities people have for voicing their grievances, real or imaginary.

It is high time, therefore, for evolving fair and efficient methods of evaluation. It is logically right that some progress in this direction should already have been made in the field of secondary education under the experienced guidance of Dr. Benjamin Bloom, and the auspices of the All India Council of Secondary Education.

We are fortunate in securing the services of Dr. Bloom, even for a short time, during a period of busy activity on his part, to assist us in the work of this Seminar and the Seminars to follow at Poona, Patna and Aligarh.

It cannot be denied that the educational situation in India has many limitations. These relate mainly to lack of experience of teachers, the pressures that are brought to bear upon examiners, and the acceptance on the part of teachers of more examination work than they can conscientiously handle, etc. These are matters which must be left to the educational administrator to find a solution for, the academician, domestic or foreign, being able only to take note of this. It is, however, true that the administrator would be helped in his task of bringing the situation under control by a fairer and more reliable system of evaluation.

I have read with great interest chapter III of the *Report on the Evaluation in Secondary Schools.* The recommendations made therein appear to me to be workable. I hope that early steps will be taken to implement the work of reform of evaluation techniques, in the schools so that the improvement brought about at the school stage could be successfully related to later work at the higher education level.

One of the tasks of this Seminar and the Seminars to be held later on should be to furnish some definite indication as to how reform of examinations at the two levels could be integrated and of the steps that may be taken in this regard.

I wish the discussions that will now begin here every success. I hope that the participants will freely express their views on this important question so that the recommendations that may emerge from the Seminar may represent the result of a wide discussion of all general problems related to examinations and pave the way for more specific discussions later so that a programme of the evaluation system for higher education may be formulated for phased implementation.

Address

Delivered by Prof. SAMUEL MATHAI
Secretary, University Grants Commission,
inaugurating the *Seminar on Examinations*
at the Patna University on 23rd July 1958.

Mr. Vice-Chancellor, Dr. Bloom, Ladies and Gentlemen,

I bring you greetings from the Chairman and members of the University Grants Commission. The Chairman himself would have liked to have been here to inaugurate this Seminar but he has been prevented from doing so and this pleasant duty has fallen to my lot. This is the third in a series of four seminars or workshops planned by the Commission. The first of these was held at Hyderabad recently and was inaugurated by the Chairman of the University Grants Commission. We planned regional seminars because we felt that they would provide a wider opportunity for more people to participate and for more subjects to be discussed. One single conference would have limited the scope of the discussion.

The problem of testing academic achievement must be as ancient as education itself. We have no clear picture of the process of examinations adopted in our own country in ancient times. But there must obviously have been some system of testing the achievement of the pupil and giving him some title which would be recognized by the outside world when he left the portals of his school or his Guru's home. I am reminded of a story of a particularly dull student whom no Guru seemed to be able to educate. Then he was put under a charge of a particularly famous Guru and the Guru put him to work. As was customary, the student ate in the Guru's house and the Guru instructed his wife to put some bitter oil in the pupil's food every day and to tell him of the reactions of the pupil. This went on for quite a long time. Then at last one day the pupil remarked to the Guru's wife that there was something wrong with the food. She then changed his food and later told her husband of the incident. Now, said the Guru, the pupil had completed his education.

This may be one form of testing achievement. But even apart from this exceptional case there have always been degrees and titles awarded to a student after a period of study and after success in some test. In fact, as we all know, the word 'degree' itself means a step. In comparatively small groups and in highly selective situations, such as must have obtained in the ancient world, achievement was easier to measure and the prestige of the institution or the teacher was a sufficient guarantee that the achievement and the test were of a high order and reliable. Today, however, we deal with vast numbers and we cannot now depend only upon the reputation either of the institution or of any teacher. The test has to be recognized as adlequate and dependable by the outside world, and so the problem of testing, with regard to the number of persons to be tested, has become complicated and difficult.

Then again, the purpose of education in the ancient and medieval world was in a sense more simple or, shall I say, single-minded. As the Bible says, 'the fear of the Lord is the beginning of wisdom,' and the purpose of education in the ancient world was to put the fear of the Lord in the student and the knowledge of God was both the beginning and the end of alll wisdom. At the University of Oxford, for instance, in the early centuries olf its existence the highest stage in the educational process was the study olf theology and the Divinity school was the highest school. But today the University has become, if one may pun upon that word, a multiversity. Knowledge has been fragmented and there is no singleness of purpose in modern university education. Knowledge is its own end and exists for itself; and each branch of knowledge pursues its own ends without reference to other branches of knowledge. One of the problems of examination therefore is to achieve comparable standards between various disciplines—to have some recognizable relationship between, say, achievement in mathematics and achievement in the study of literature.

There are other differences too between the medieval University and the modern University. In the medieval University the student was much younger than he is at most Universities in the world today. We know, for instance, that in the 15th or 16th century it was possible for a boy of thirteen or fourteen to graduate from the Universities of Oxford and Cambridge. Today the University student is a somewhat older person and when he enters the University he is supposed to be already, in some measure, an educated person. This has also made the problem of testing his achievement at the University different from what it was in the medieval world.

So what with the increase in numbers and the multiplicity of branches of knowledge and the large number of teachers and subjects involved and

the fact that the examination has to be a written examination have made testing a very difficult matter. In the old days very often the testing of a student was through some kind of a debate or "wrangling" as at Cambridge for instance. This has given place to the wholly written examination in most places and we now know that these written tests with no direct personal contact between the student and the examiner who is conducting the test is likely to be exceedingly unreliable. Several studies have been made of the examination systems of modern times and these studies have demonstrated that examinations can be very erratic.

In our own country the situation has deteriorated very greatly. In India we have always tended to emphasize memory. We recall how in our own boyhood days we learnt our arithmetic or our Sanskrit. This has given an undue preponderence to memory as against understanding in our educational system and our examinations also have tended to test what is remembered rather than what is grasped or understood by the student. The bulk of our students in India are not true scholars, unlike the Oxford scholar, of whom Chaucer speaks, who would rather have twenty books at his bed's head than many rich clothes or other fine things. Nor are they true Brahmacharis or seekers after the truth. A University degree is a title for admission to employment and the degree rather than the learning is what people want. Shortcuts are devised by students and teachers alike. Most of our public examinations are conducted by external examiners who have very little knowledge of the work done by the students.

As most of you no doubt are aware, the Radhakrishnan Commission had recommended certain changes in the examination system. The interest in the reform of the examination system has been fairly wide-spread, but so far it has not been possible to make any real experiments in this direction. Since the University Grants Commission came into existence, it also has concerned itself with this question. As you know it is one of the Commission's functions to maintain standards of teaching and examination in the Universities. It is in order to make possible a thorough investigation of the whole question that this Seminar has been called. Although we are now primarily concerned with the question of reform of the examination system it must be remembered that teaching and learning are more important than testing. Examinations have to be related not merely to what is supposed to have been required as inert knowledge, but to the whole business of the motive, scope and purpose of learning. Examinations unrelated to the real nature of the learning of the pupil are bound to be inadequate and often unjust. So a discussion of the whole problem of teaching and examining is necessary.

It is to provide an opportunity for such a discussion that these seminars have been called. Dr. Bloom of Chicago University has done more thinking and planning in this field than many other persons. We are grateful to him for making his knowledge and time available to us. This is an opportunity to survey the whole business of University education. It is as important to ask the right questions as to find the right answers. I trust that this Seminar will be truly profitable and enjoyable and that representatives of Universities who are here will carry with them a continuing concern which they will be able to communicate to others in their Universities. On behalf of the University Grants Commission I have great pleasure in inaugurating this Seminar.

Address

Delivered by Dr. R. P. PARANJPYE
Vice-Chancellor, Poona University, inaugurating the *Seminar on Examinations* at Poona on 17th July 1958.

On behalf of the Poona University I have great pleasure in welcoming you, Dr. Bloom and other members of this Seminar, and trust that they will have a useful and interesting session.

Personally, my experience of examination work is now comparatively old, though forty years ago I used to do a good deal of examination work in the Universities of Bombay, Panjab, etc. Since then, however, I have had a great deal to do in the conduct of examinations, in my capacity as Vice-Chancellor of Lucknow and Poona Universities, and occasionally in interviewing candidates for admission to services, etc. Further, as one interested in the subject of education in all its branches, the question of examinations is one to which I have given considerable thought. I, however, do not desire to detain you long with detailed remarks of my own. I will only touch on a few points which have to be considered in discussing the subject of 'examinations'.

Everybody agrees that examinations of some kind or the other are a necessary evil. We hear diatribes against them everywhere; but no effective and fool-proof method has, to my mind, been suggested for replacing them. If the aim of education is to implant habits of intellectual discipline among the pupils, make them intellectually alert and bring out of their latent abilities, I am afraid some periodical tests are absolutely necessary; for as my Mathematical teacher at Cambridge loved to parody Newton's first law of motion, "everybody continues in his state of rest unless compelled by impressed forces to change that state", and examinations serve to supply these forces and make the student move forward in his intellectual development.

It is, of course, true that you cannot accurately gauge the amount of work that a pupil does in one or two or three academical years by merely

looking at his written answers to a certain number of question papers. He might have occasionally forgotten a part of the work that he did in the earlier part of his academical course, or he might have neglected some portions of the curriculum and concentrated on others, or he might have got into a kind of mental disequilibrium or fright at the time of the examination, and it is certainly a hardship to damn him forever for his unsatisfactory performance in the examinations. Further, there are some who are not able to do full justice to their capabilities in such a trial.

We are often given instances of people who have eminently distinguished themselves in their examinations but have not justified the high expectations placed on such results in their after-life. On the other hand, many who did not do well in their academic career, as measured by the results of their examinations, have done very well indeed in their after-life. In Cambridge, they used to give the example of William Thomson, the future Lord Kelvin, perhaps the most distinguished scientist of his age, who was beaten in the Mathematical Tripos by Parkinson whose name is now hardly heard of, and how Parkinson's success was due to his exceptional ability at fast writing which in the Cambridge Tripos examinations is worth a great deal when the question paper is fairly long and a pupil can answer as many questions as he likes. I remember to have heard of a witty French book on what the author called the forty-first member of the French Academy detailing the names of most eminent French authors who did not succeed in getting among the forty immortals, but whom posterity unanimously regards as far superior to their forty contemporaries who were members of the Academy. I believe, such miscarriages or misjudgments are likely to occur in all human actions; but I believe it will generally be agreed that, taken as a whole, the average of the men who are in the first ten in any given examination is superior to the average of the men who are the next ten in the same list, as judged by their performance in their after-life.

In considering the utility of examinations as a test of real merit, we must not forget the occasional vagaries of examiners themselves. An answer-paper which one examiner might rate at 70 per cent might be rated by another equally competent examiner at 50 or even 45 per cent and this applies especially in those subjects in which questions of the essay type are set. In my own subject of Mathematics, I believe, the discrepancy in the judgment of two different examiners on the same answer-paper will, probably, be not more than five per cent. Then again, we have been presented with instances in which an examiner when asked to examine the same set of answer-papers at intervals, say, of six months, is often found to

judge them very differently indeed. But, I believe, that the comparative valuation of the different answer-papers in the two trials will be found to be not very different although the absolute marks given may, perhaps, show considerable discrepancy. But, this, probably, is due to the fact that on these two occasions he has perhaps set a different standard of attainment before himself.

Similar objections are often raised against oral examinations or the marks given at interviews. I believe, the object of an interviewer should be not to find out what the candidate does not know but to see whether anything the candidate is supposed to know is a real part of his mental make-up and whether he has brought his own mind to bear upon the subject in question. I think a Board of four or five Examiners will generally assess a candidate within about five to ten per cent of difference among themselves. Of course, I leave out of account cases in which any of the interviewers is a faddist or is unreasonable.

I have referred above, in passing, to the essay type of questions on which the judgment of an examiner is likely to be questioned or in which the candidate might not have been able to do justice to himself. Such questions requiring the writing of a longish essay ought, if possible, be replaced or supplemented by questions of an objective type in which the answers are short and definite. But the essay type of questions cannot be entirely dispensed with as they test the ability of the student to have an integrated and connected view of some part of a subject, and also whether the candidate is able to exhibit his knowledge in a consecutive and intelligible form. After all, while memory is a very important faculty of the intellect, the habit of connected thinking is equally valuable, if not more. I, of course, am conscious of the fact that there is a kind of examination technique which some students possess and others lack. There is a kind of window-dressing in answering questions in which some students shine while others are deficient; but this faculty is not entirely without its use in practical life.

Then there are proposals to do away with practically all examinations and assess the work of the student by his record throughout the whole year. This would be theoretically perfect if there were enough teachers and each teacher had to do only with a small number of students; but, in the present state of our big classes, it would be very difficult for teachers, especially in the earlier stages of education, to keep an adequate and satisfactory record of each student on which to pass a final judgment. There is also a great risk that this record might be, to a great extent, biased by personal considerations and by the direct or indirect pressure which may

occasionally be brought to bear upon the teachers. I think the human element involved in the preparation and assessment of these records is far greater than the human element involved in judging the answers of students at public examinations conducted as at present, although even here cases of direct or indirect influence are not entirely unknown.

On the whole, therefore, it appears that harmonious combination of public examinations, including questions requiring objective answers as well as answers of the essay type, oral examinations when practicable, and the assessment of carefully kept records, would be the ideal. How far this ideal can be attained is a question for practical educationists and I trust that this Seminar will evolve some method by means of which this essential constituent of an educational system, viz. examinations, can be utilised and worked in the best possible manner.

I am glad that this Seminar has decided to restrict the field of detailed examination to the subjects of Botany and Economics. These provide different kinds of subjects—one more or less objective, the other more or less subjective—and your discussions will, I am sure, be of great benefit to all academical circles.

I am very much obliged to Dr. Bloom and the University Grants Commission for the honour of having this Seminar in this University, and I extend a hearty welcome to Dr. Bloom and to the representatives of the other Universities who are honouring us by their presence here. I trust that your deliberations will be both instructive and interesting. I have great pleasure in now declaring this Seminar open.

Finally, I regret that, owing to other domestic engagements, it will not be possible for me to attend this Seminar frequently but, I hope, the members of Seminar will excuse my apparent discourtesy.

Address

Delivered by Dr. BALBHADRA PRASAD, Vice-Chancellor, Patna University, at the *Seminar on Examinations* at Patna on 23rd July 1958.

Prof. Mathai, Dr. Bloom, Delegates to the Seminar, Ladies and Gentlemen,

It gives me great pleasure to welcome Dr. Benjamin Bloom and the delegates of the Seminar on examinations organised by the University Grants Commission on behalf of the Patna University. This is the third Seminar which the University Grants Commission is holding for the Universities of the Eastern Region. The presence of Dr. Bloom and other delegates and their deliberations will, I am sure, bear great fruit and help us to make some much needed improvements in our system of examinations.

I am extremely thankful to the Organisers of this Seminar for having asked me to preside over this function.

In the good old days study was not as common as it is to-day. Only some privileged were going in for studies. The result of the examinations generally did not have much effect either on the life of the students or on the life of the community. Persons were not appointed to posts on the basis of their passing any examination. The students read with teachers as long as they liked. Very often there was no question of passing an examination or failing to pass an examination. Students were benefitted according to their capacity, the teachers imparted knowledge according to their capacity.

As the power slowly passed to the hands of the common men, the idea of equality of opportunities also gained ground. The idea that the benefits of education should not be confined to a few became dominant. The demand that the various responsible positions in life should go by merit became slowly accepted. The demand for education became universal. The State had to incur heavy expenditure on the expansion of education. In some countries big businessmen and industrialists also gave money for the expansion of education. The result was that a number

of students went to schools and colleges everywhere. The old position that a student read as long as he liked without caring to appear in any examination could not continue. The merit of those who were studying in the schools, colleges and in the universities had to be assessed. The employment agencies wanted some assessment; the guardians wanted assessment and very often better students themselves wanted assessment. Some rough and ready method had to be found out. This rough and ready method is the examinations which we are having to-day.

The modern age is a scientific age. A scientist always goes on examining his apparatus and tools and tries to make them more and more reliable. Our examinations which are our tools for assessing the merit of students are under examination and we are trying to assess how far they are reliable, to what extent they are uncertain, to what extent they are redundant, to what extent they require modifications and what should be the modifications. A good deal of studies, examinations, re-examinations, search and research is going on in this direction. Our country has been late in coming to this field. Because we are late, we have to work very vigorously. We have also the advantage of utilising the experience gathered by other countries.

The purpose of our education is to make good citizens by giving sound knowledge of things which matter and by developing a desire in our students for better living, both physical and moral, and by developing their capacity to make a better world. They have not only to possess sound knowledge but have to learn to express themselves; they have also to develop a critical faculty to distinguish the right from the wrong. The purpose of any examination has to be to test knowledge, the power of expression and the critical faculty of students. Our existing essay type of questions have been very much criticised. Some would like to replace them wholesale; some would like to replace them partially. There is no doubt that partial replacement, at least at the lower stages, is absolutely essential.

One examination at the end of a year or two years has got its defects. The students who have better memory distinguish themselves as they would in any system of examination. A large number of students do not work for the whole of two years and work only at the time of examination so that they are not able to develop to the greatest possible extent. Our percentage of failure is rather high. Any efficient machinery has to work in such a way that there is minimum wastage. In some of the Universities we are admitting students after a good deal of elimination. We are selecting the best students; still our results are poor. Our large

failures are due to our unbalanced examination system. Our system of examination has not only to assess the merit of the students but also to help them in their development. More frequent examinations if they are attached some value would make the students more serious in their studies and are bound to produce better results and lesser wastage. We have, therefore, to introduce frequent internal assessment and these assessments have to be given some value at the end of every stage in educational life.

In this world many things go wrong because they are not properly applied and because they are not honestly applied. Internal assessment at times becomes unreliable for lack of proper and honest application. No problem in the world can be solved without creating some new problems. In the twenties we were very keen on controlling epidemics in India. We have controlled them. This has created the problem of a rapidly increasing population. This problem of rapidly increasing population is not as frightful as the problem of epidemics. But this problem has also to be solved. Similarly, when we introduce internal assessment in our examinations, there is no doubt it will bring in newer problems. As long as the problem created is of lesser magnitude, we should not shirk the introduction of a change. Life consists in trying experiments, learning even by error. Fighting shy of new ideas would not lead to any improvement. The reforms brought about in the examinations have to be cautiously calculated reforms. But once we decided to have them, we should apply them with courage and confidence.

For introducing the reforms in the examinations it is necessary that we should get the opinion of a number of persons and these opinions should be discussed across the table so that defects are removed as far as it is humanly possible to remove them. Nothing could be better than a seminar for this purpose. I take this opportunity of thanking the University Grants Commission for organising this Seminar. The Seminar is sure to examine not only the ideas but also the practical results. A number of Boards and Universities have introduced the system of internal assessment. It may be worthwhile to compare the marks in the Internal Assessment and the External Examinations of a Board as a whole and of a number of Schools. Ideas bear best fruit when they are checked and modified by experience. I am sure this Seminar of eminent educationists from the whole of India with the advice of Dr. Bloom is sure to give us sound recommendations. With these words I request Professor Mathai to inaugurate the Seminar.

Address

Delivered by Dr. P. J. PHILIP, Development Officer, University Grants Commission, welcoming the delegates to the *Seminar on Examinations* at Aligarh University on 1st August 1958.

Col. Zaidi, Dr. Bloom, Ladies and Gentlemen,

I rise to welcome you all to this seminar which is the last of a series of four seminars organised by the University Grants Commission to consider the question of examination reform. The first three seminars were held at Hyderabad, Poona and Patna and were attended by university teachers of the respective regions. The present seminar, which will go on for four days, is being attended by representatives of the universities of Aligarh, Agra, Delhi, Panjab, Gorakhpur, Kurukshetra, Roorkee, Allahabad, Lucknow, Banaras, Jammu & Kashmir and Rajasthan. I extend to them all on behalf of the Commission a most cordial welcome.

As you are aware, maintenance of standards of examinations in Indian universities is one of the statutory responsibilities of the University Grants Commission. The Commission has already appointed a Committee consisting of educationists and experts to consider the problem of bringing about improvements in the existing examination system. The universities have also been requested to communicate to the Commission the objectives at present governing teaching and examinations in different subjects. The Commission has, further, initiated a critical study of the system of examination in the Aligarh Muslim University, as a pilot project.

The University Grants Commission decided in this connection to take advantage of the presence in this country of Dr. Benjamin Bloom, Professor of Education and the Head of the Department of Examinations of the Chicago University, who has been invited by the Ministry of Education, Government of India, to advise on the steps that may be taken to reform Secondary School examinations. We are grateful to the Ministry for kindly lending him to us so that seminars could be held for the benefit of university teachers. Dr. Bloom will also meet the members of our Examination

Committee before leaving India. I may say that Dr. Bloom's interest in the reform of the examination system is not merely academic, but also human, born of a real concern for the teachers and students.

You will agree that unprecedented opportunities lie before the educated youth of today to serve the nation. It cannot be denied that the country has a right to expect from its universities men and women who will provide the right kind of leadership in administration, industry, education, literature, arts and the like—"mentally fit persons competent not only in the subjects of their specialisation but possessing capacity to think, to distinguish the parts and to grasp the whole, to judge for themselves between right and wrong, true and false, beautiful and ugly". Are our universities discharging this function in a satisfactory manner in this critical period of the nation's history and of the world?

It is in this context that the system of teaching and examinations prevailing in our universities becomes significant and its improvement a matter of the utmost importance. While our present system cannot be wholly condemned, it must be admitted that there is considerable scope for its betterment. Today examinations are largely a test of memory. Questions are 'expected' and performance in the examination depends on remembering the answers to the anticipated questions.

Recent investigations undertaken by Dr. Bloom and others have shown that by clearly defining the objectives of teaching of each subject and organising the learning and testing processes in the light of these objectives the examination system can be made more efficient and our universities helped to fulfil their task of imparting real education to the students. Examination reform thus entails a simultaneous improvement of the processes of teaching, learning and testing. The three functions are so interrelated that we cannot improve any one of them without at the same time improving the others. Herein lie the significance and potentiality of examination reform.

I shall not trespass any further into the field that legitimately belongs on this occasion to your distinguished Vice-Chancellor, who has very kindly agreed to inaugurate this seminar and to Dr. Bloom our honoured guest who has placed us in his debt by agreeing to guide its deliberations. I shall conclude by welcoming you all once again to this seminar and wishing your deliberations success.

Address

Delivered by Mr. B. H. ZAIDI,
Vice-Chancellor, Aligarh Muslim University,
inaugurating the *Seminar on Examinations*
at Aligarh on 1st August 1958.

Friends and Colleagues,

I feel great pleasure in associating myself with Dr. Philip of the University Grants Commission in welcoming you most warmly to this University. The decision of the Commission to select Aligarh as the venue of this Regional Seminar of the Northern Universities clearly reflects their recognition of the work that is being done at this University to improve the methods of examination and devise suitable instruments for effecting this improvement at the University level. Although a small body like our Psychometric Unit cannot be expected to bring about radical changes in a short period of three years, it has, to some extent, succeeded in indicating the lines along which research work of this kind should be conducted. Research in examinations should be continually associated with the work of curriculum reorganisation which may involve identification of new objectives, new content and new methods of instruction. And since curriculum reconstruction is more or less a continuous process in any progressive institution, some sort of an examination research unit will have to be maintained on a more or less permanent basis for effecting the desired changes and for assessing their impact on instruction in the Universities.

The reform of examinations is one of the most vital problems facing our educational workers today. We find that our entire system of education has been and continues to be examination-centered rather than student-centered or society-centered. All the educational effort put forth both by our teachers and students in the Universities is positively oriented to the passing of examinations. The preparation of students and the pattern of their study are very largely guided by the kind of questions they are required to answer. What students study is highly selective, centring on the expected questions or items of knowledge which are usually tested at the examination. Large portions of significant subject matter as

also the disciplinary values of a subject are almost entirely overlooked and effort is concentrated on committing facts to memory and reproducing them at the time of examination. It would be unjust to put the entire responsibility for this state of affairs on teachers and students. The achievement of a student is almost solely judged in terms of a single performance at the final University examination which is usually a feat of memory rather than an index of a student's ability to think and to apply the knowledge gained to actual problems of living. The fact that the student merely collects a body of facts at the University which he soon forgets after passing an examination, and learning of facts is more an exercise of his faculty of memory rather than a training of his mind, is borne out by the poor scholastic achievement of an average graduate of an Indian University. Frequent and insistent demand on the part of the students for gaps between papers in the examination schedule, is clearly indicative of the fact that the students mug up on the eve of examinations and are eager to have it "off their chest" as quickly as possible. The gaps between papers give them the much needed time to mug up half-understood and half-digested facts which they reproduce at the next day's performance.

Our examination system is a legacy of the pre-Independence days when the best preparation for the sons of the middle class, who filled the Universities in those days, was to learn a few skills of communication and a few essential facts. The emphasis on the essay examination provided to our students a training to write good reports or do clerical jobs when they became public servants in later life. The question of training students in social skills and helping them form desirable social and political attitudes received little attention in our colleges and universities. But with the advent of freedom we have to shoulder responsibility for training efficient citizens for our new democracy—citizens who do not merely possess a knowledge of things but are also able to take their full share in the cultural, economic, political and social life of the community. They have to learn the art of living and working together for a common purpose, because we are working towards a social order where cooperation must replace competition. The great projects undertaken under our Five Year Plans symbolise the achievement of concerted and cooperative effort. They are a concrete proof of the tremendous progress a community can make through pooling experiences and talents of various kinds and helping every individual to have a sense of participation in achievements which are beyond the grasp of single individuals howsoever gifted they may be. The success of such enterprises will depend largely on the ability of workers to exert themselves for a common cause. This ability will not emerge overnight

but will have to be steadily developed in the future citizens by providing them with the experience of tackling life problems at their own level under the best guidance available. Preparation for the new democratic social order will not, therefore, be restricted to the learning of facts and the acquisition of a few skills. It will have to be a comprehensive training in which all the qualities of head and heart that are needed for efficient democratic citizenship are developed. The prejudices of caste and colour, language and creed, state and nation, will be replaced by an intelligent broad-minded and secular approach to all problems of living. In short, we shall have to produce thinking men, equal men and cooperative men, if our aspiration to build a democratic pattern of life is to become a reality.

The emerging pattern of our social and political life calls for a thorough examination of our educational system all along the line. We have to redefine our educational objectives in more concrete terms. What constitutes that knowledge and understanding, and what are those skills and attitudes, intellectual as well as emotional and social, that are needed to be developed in a citizen? For this purpose we will have to select a new content, evolve new and varied techniques, new methods of study and a new system of evaluation. An examination system which puts a premium on memorising is obsolete and out-moded for this purpose. An examination system which helps in the evaluation of the all round growth of a student's personality will have to be comprehensive, flexible and suitable for assessing both the tangible and intangible products of a student's training.

Another depressing aspect of our existing examination system is that it permanently labels students as superior, average or inferior on the basis of a single performance at a final annual examination where the element of chance predominates. They hardly provide incentives to the students to improve themselves. It was said by a distinguished colleague at an examination seminar that there is a merit in a final examination in as much as it marks a crisis in the life of the student which calls forth supreme effort on his part. He is challenged to marshal his resources and experience to prove his competence. But I am afraid that this great effort is largely wasted. Such an examination, in the first place, throws a tremendous burden on the student's memory rather than serve as an instrument to test his ability to think, to marshal relevant evidence and to draw valid inferences from that evidence. It does not provide a measure of his emotional and social development. Secondly, the student who passes through such an ordeal is none the better after this soul-killing experience. He gets no opportunity to reflect on the experience he has gained and to

improve his subsequent performance in the light of that experience. We keep the examination marks and the marked answerbooks 'confidential' depriving the examinee of a useful discussion with the examiner on his performance.

By discussing the student's performance in an atmosphere of goodwill and mutual understanding the teacher can help a student to form a correct estimate of his strength as well as his weakness. The ability to look back critically on one's past experience, to identify its successes and failures and to evaluate the processes which led to them is an essential condition for all progress both in the class room and elsewhere. Continuous self-improvement results from this capacity to profit by one's experience. In this sense the best form of evaluation is self-evaluation. Opportunities should be provided to our students to sit in judgment on their own skill and attainments and thus help pave the way for better achievements in the future.

As already stated, another important function of examinations is to enable the teacher to provide assistance of the right kind at the right moment. This can only happen when the examinations are more comprehensive and informal and teachers associate closely with students in smaller groups. In such groups, there is a two-way traffic between the teacher and the taught. The teacher has an opportunity to peep into the minds of the students and to understand their inner working. The students, too, have a sense of participation through frequent opportunities to express themselves. Such informal methods of instruction must necessarily have somewhat informal evaluation to assess a student's achievement. Here examinations will not be used primarily to divide students into categories; instead, they will become a means for the evaluation of diverse talents, skills and attitudes and thus help the student to discover where his main strength lies. The function of education, to quote Gandhiji, is to draw out the best in every man and woman. An examination that helps every student to discover and improve himself is the only kind which will enable him to rise to his full stature and contribute his best to the welfare of the country.

In posing the examination problem before you I have deliberately confined myself to the general function of examinations and to show their relationship to changes in the social situation calling for a redefinition of our educational objectives. We are lucky in having in our midst Dr. Benjamin Bloom, sometime Professor of Education and now Chairman of the Board of Examiners at Chicago University. I am sure that under his distinguished leadership this Seminar in which some very senior University

teachers are participating, will be able to formulate constructive suggestions for effecting the desired changes in our examination system.

May I, in conclusion, sound a note of caution. Each examination affects a large group of students and in that sense leaves an impact—good, bad or indifferent—on a whole generation of young men and women. Any changes in the existing system or any experimentation that is a prelude to the actual change must be softened by the consideration that human material must not be subjected to sudden jolts but gradually led towards proper adjustment to changed conditions in life and society.

SEMINARS WITH UNIVERSITY PROFESSORS

The University Grants Commission arranged four seminars for faculty members of the Universities of India to consider problems of examination reform. In the initial invitations, which had been sent before I arrived, each University was requested to send one or two representatives. No details were given as to the qualifications of the representatives although it was apparently assumed the persons sent to the seminars would be individuals who were especially interested in the examination problem and persons with responsibility for the administration of examinations.

When I arrived in India, a meeting was held with members of the University Grants Commission to consider the purposes and functions of the seminars. Since the problems of examination reform are closely related to problems of teaching, it seemed to me that more could be accomplished if the seminars became work sessions centering on the relations between the examinations and the learning and teaching. Such work sessions might also give clues as to the desirable directions for the improvement of examinations as they related to the learning and teaching of particular subject fields. While it could not be expected that brief seminars would bring about a definitive solution for each subject field, the seminars could explore the kinds of thinking required to attack the problem of examination reform and they could also provide some illustrations of the types of examinations which would best serve the needs of each subject field. As a result of this meeting it was decided to request the Universities to send representatives in particular subject fields. The Universities graciously accepted these last minute changes in the invitations and sent excellent representatives in the appropriate fields.

Since rather complex kinds of thinking were required it was necessary to limit the number of fields at each seminar to only two subjects. In a very arbitrary fashion eight subjects were chosen from the University programme and the seminars were planned as follows:

Hyderabad Seminar	— Political Science
	Chemistry
Poona Seminar	— Botany
	Economics

Patna Seminar	– Mathematics
	Psychology
Aligarh Seminar	– History
	Physics

Universities in closest proximity to each of the seminar locations were invited to send a faculty member for each of the two subjects to be considered at that seminar. About 10 to 12 faculty members came for each subject and each of the seminars included 20 to 24 participants.

Many of the seminar participants spent a good deal of time pondering (in private) the possible relationships between the two subjects at their particular seminar. They were much reassured when they found that chance rather than plan had determined the combinations.

A number of University people expressed great concern that the seminars didn't include some of the technical fields or some of the professions such as law, medicine, and social work. Others were very annoyed that departments of education and the training colleges had not been included. One can only plead guilty to such criticism. However, it was not possible to include more than eight fields in the four seminars—especially with the very serious time restrictions for each of the seminars.

The seminars were limited to four days each and could therefore be used to do little more than explore the problems. Some of the persons who felt other fields should have been included evidently thought of the seminars as training programmes. This could hardly be the case given the conditions under which these seminars were arranged. The seminars could only be illustrative of the thinking and work required to attack the significant problems of examinations reform. It was hoped that these illustrations would give some clues as to the work and thinking required in the future in these eight fields as well as in the other major fields of higher education.

Prior to the seminars, each of the participants was asked to make a list of the important educational objectives for his field. Each participant was also asked to bring samples of question papers and syllabi and to consider in advance some of the suggestions he would propose for examination improvement.

Each of the seminars began with a brief introduction to the problem of examination reform. Examination reform can only be made if students are adequately prepared for the kinds of questions and problems they will encounter in the examinations. If students are not prepared appropriately

they will object to any new form of examination, and quite rightly, since the examinations, no matter what form they take, must give the student a fair chance of success. Thus examining and teaching are bound together. One cannot change without the other. Teaching cannot change unless the examining changes, and vice versa.

However, if either or both are to change, they must change in some *direction*. The direction of change brings up the first major question which the writer raised in each of the seminars.

What are the objectives in the teaching of Physics, or Mathematics, or Economics, etc.? In what way should a student who has successfully studied physics be different from one who has not? How should a student who has studied economics differ after the study of economics from what he was before the study of this subject? Underlying this question is the assumption that the process of education brings about major kinds of growth or development in the student. It is also assumed that the faculties are responsible for determining and making explicit the kinds of growth that they view as necessary or desirable.

This was a difficult question and some of the participants were a bit embarrassed because they viewed it as one of determining the major virtues of men—honesty, love of fellow-men, patriotism, desire for peace, loyalty, etc. Others viewed it as a self-evident and somewhat silly question—everybody knows what a historian should be like, or a mathematician, or a chemist. Some wished to answer the question by citing each of the topics in the syllabus—mechanics, electricity, magnetism, motion, etc. for physics.

After considerable difficulty it became evident that university professors had less difficulty in thinking about the educational objectives in fields other than their own. Since this seemed to be a useful way of getting around the initial difficulties, we began by selecting some neutral subject—one that overlapped with neither of the two subject groups at the particular seminar. It is to be noted that work on this neutral subject was used only for illustrative purposes. After preliminary work on this neutral field, each group attempted to work on its own subject field. Part IV of this book shows some of the results of this work in each of the eight subject fields—including physics by physicists.

In some of the seminars, physics seemed to be a good neutral field. We began by listing on the blackboard the major topics found in the physics syllabi of the different Universities.

Physics Content	Possible Physics Objectives						
	1	2	3	4	5	6	7 etc.
Heat							
Light							
Motion							
Mechanics							
Electricity							
Magnetism							
Modern Physics, etc.							

Then I asked each of the members of the seminars to independently list three or four kinds of growth or development they might expect of a student who studied these topics to the Bachelor's level.

The most frequent objectives noted by the groups were

1. The student should acquire a knowledge of the basic terms, ideas, principles, theories, and methods of the field.

2. The student should be able to apply the major principles and methods to new problems (that is to problems new to the students or not considered in the class).

3. The student should become able to observe and record physical phenomena accurately.

4. The student should be able to take a new problem and formulate it in a more precise form or in a form which the field of physics can be used to answer.

5. The student should be able to plan new experiments to test hypotheses.

6. The student should be able to carry out simple original research investigations.

7. The student should develop skill in using physics equipment and methods of laboratory research.

8. The student should be able to indentify cause and effect relationship in the observations and experimental data, and should be able to interpret and analyse the data.

9. The student should be able to recognize the significance as well as limitations of major principles and theoretical formulations.

10. The student should be able to express his ideas logically and clearly.

11. The student should develop the ability to read and comprehend new technical developments in physics.

In addition to these objectives which require knowledge and intellectual skills and abilities, the participants suggested interests, attitudes, and values they would like the student to acquire. Some of these were

12. The student should develop a scientific attitude.

13. The student should develop an interest in scientific hobbies and leisure time activities.

14. The student should develop a habit of suspended judgment until adequate evidence is available on a question.

15. The student should strive to emulate some of the great men of science.

16. The student should develop an appreciation of the contributions of science to the world.

It was evident to the group that while these objectives appear to be valuable not all of them are of equal importance. It seemed useful to the group to briefly explore some of the considerations that might be involved in selecting among objectives and in determining which objectives are the more important ones. Underlying this is the assumption that the learning required to achieve the objectives requires time and effort and it is not possible in the limited time and with limited resources available to the educational institutions to accomplish all the possible objectives. There is also the assumption that some purposes of education are more important and fundamental than others. The problem is one of determining the kinds of thinking and consideration which will give the educator and the society confidence that the objectives of learning selected for intensive development are the really important and significant ones.

One consideration in selecting among objectives is the conception of the *subject matter*. It is evident that physics as a subject field can not be used to develop any type of growth in students one might like. One might expect the fields of physics and literature to emphasize quite different educational objectives. It is also conceivable that two such different fields might include a few objectives in common. Physics includes the findings of physicists, the methods used in studying the phenomena of physics, and the theories and conceptualizations of the field. It is a rapidly changing field with new discoveries and new methods being introduced from time to

time. Looking at the objectives purely from the nature of physics it was evident to the group that objectives 1 and 2 are of primary importance. Some members of the group held that objectives 3, 4, 5, 6, and 7, were of equal importance to objectives 1 and 2 if one regarded physics as a method of studying phenomena rather than purely as a body of knowledge. The rapid changes in the field of physics also suggest that objective 11 will be of increasing importance. Objective 10—*the ability to express ideas logically and clearly*—is relevant to physics but it is also equally relevant to language and writing courses. In some ways this objective is relevant to all subject fields—but not more to physics than to other fields. Objectives 13 and 15 seemed less clearly central to the study of physics subject matter at the University level than many of the other objectives.

Another consideration in selecting among objectives is the nature of the *society* and the problems it requires individuals to solve. The rapid strides in India toward technological changes, the increasing importance of physics and the sciences in the life of the people, and the increasing need for well-trained individuals in physics suggests that objectives 1, 2, 3, 4, 5, 6, 7, and 8 are of major importance from this viewpoint while objectives 13 and 15 are probably of considerably less importance. Some members of the group were of the opinion that the changes in the Indian society make objectives 12 and 14 the most important possible outcomes of learning physics.

Some members of the group wished to place stress on the *nature of the society* as the major consideration for thinking about educational purposes. They pointed out that the independence of India as a political state, the needs of the people for political literacy in a democratic state, the vast changes taking place in industry and agriculture, and the awareness of economic, social, and political problems are changes of profound significance in India which must in some ways affect the purposes of higher education. In fact some members of the seminars felt that it is these changes in the Indian society which make it imperative that the Universities now reconsider the methods of examining, the methods of teaching, and the methods of learning used by the students.

Another consideration in selecting among objectives is the nature of the *students* who enter physics courses. What objectives have they already attained through previous instruction? What is their motivation for the study of physics? What is their aptitude for new learning? How complex a level of learning can they attain? This is a problem that can only be answered by gathering evidence about students. It is possible that many of the students have already attained some of the objectives to a low level

and that the advanced work at the University level may begin at a considerably higher level if the students have already acquired a good background at the secondary school level. If the students already possess considerable competence in the ability to express ideas logically and clearly (objective 10) this need not be given major emphasis at the University level. If the students already have developed a scientific attitude (objective 12) to a high degree this need not be greatly emphasized in the University. It is clear that only as we know a great deal about the attainments and aptitudes of the entering students are we able to select the objectives which are in most need of further attention. Such evidence should enable us to give less time and attention to objectives the students already have attained to a considerable degree. This evidence will also enable us to make judgments about the time and effort required to bring students up to the desired level in a particular objective.

Some of the seminar participants were of the opinion that little could be expected of students up to the Bachelor's level because they believed that the undergraduate students' interests and attitudes toward learning are not as positive as might be desired. Such participants regarded the Master's level as the appropriate level to introduce more complex learning. Some participants were of the view that if students are introduced to new ways of studying and learning in their first year in the university, it would be possible to rapidly move toward the more complex learning in the second and third years of university work. It is clear that some of the universities are finding that the students are having difficulty in learning because of inadequacies with the English language which is the medium of instruction. In any case, it was evident to the seminar participants that the characteristics of students may be one basis for making decisions about the educational objectives which may be achieved in the future as well as decisions about the objectives already achieved by the students. Such evidence may also be used as one basis for making judgments about the conditions under which particular objectives can be achieved by the students.

Another basis for consideration of educational objectives is the basic *value* system and philosophy of the society. If the value system of a society places great emphasis on the development of individuals who will not make independent decisions but who will do only that which they are directed to do by others, it is likely that some of the objectives stressing independent problem solving and decision making will be given very little emphasis. If the values of the society place great emphasis on practical and utilitarian skills then certain other objectives (perhaps 1 and 7) will be regarded as

most significant. There are many different philosophies and value systems in the different societies and nations of the world and it is likely that these will have consequences in reaching decisions about objectives and curriculum in even such international subjects as physics and mathematics. They will perhaps have even greater consequences for such fields as literature, the arts, and the social sciences.

The attempt to relate philosophical and cultural values to educational purposes is a subtle and complex task which curriculum makers may frequently seek to avoid. It seems so much easier to adopt the educational purposes and educational methods of other countries. It is possible that the values of the culture have a greater influence on primary and secondary education than on higher education. However, the effects of the value systems on educational purposes and methods may be seen most clearly in a comparison of the US and USSR at all levels of education.

A final consideration in selecting among objectives is the faculty's view of *learning* and how it takes place. If the faculties view learning as simply repeated practices and drill over particular material or skills, then only a limited range of objectives will be regarded as possible. If the faculties view learning as the development of new insights and skills which can be related to new and complex problems, then additional objectives are regarded as possible. If the faculties understand how learning can affect personality and character and attitudes and interests, then such objectives are regarded as important and as possible of attainment even in the more traditional subject fields. The view of learning may set limits on the objectives regarded as possible. This view will, of course, determine the choice of learning experiences regarded as appropriate.

It was unfortunate that the time available did not permit us to more than briefly explore some of the considerations which help to determine the possible importance and weight to be given to different educational objectives. The main point of these brief considerations is that educational purposes represent more than the whims and fantasies of a group of professors. Educational objectives must be given serious attention in thinking about the improvement of a curriculum. The best thought of a capable group of faculty members is required at this most crucial step in planning a single course or an entire educational programme.

A second question which we raised in these seminars was "What is really meant by each objective?" The educational objectives tend to be rather general and ambiguous statements which each person interprets in his own way. It was very revealing when members of the seminars attempted

to independently define what they meant by a particular objective. The unity of thinking expected by some of the seminar participants was not always apparent even when the objective was one from the subject field in which the participants were specialists. We found it useful to attempt to define the objectives in terms of the kinds of thinking, acting, or feeling which is regarded as appropriate for a student who has attained the objective to a high degree. The attempts to define educational objectives operationally will be found in the illustrative material in *Part* III of this book. Many of these could be developed further if time permitted. But, at least, the direction for such definitions can be followed from the material given in *Part* III.

A third question raised in these seminars was "How would you be able to determine whether a student had achieved the objectives?" Here the participants were asked to use their definitions of the objectives as a basis for determining the evidences needed to establish the students' attainment of the objectives.

With little difficulty the participants were able to formulate examination problems (usually of the essay type) which would be appropriate to the objective. However, many of the participants were able to prepare a greater variety of examination situations. In some cases they specified the observations to be made of students, essays—projects—or products of the students which could be appraised, and interviews or *viva-voce* examinations which could yield relevant evidence. All were regarded as relevant methods for determining the extent to which the students have attained particular objectives. This was the point of greatest insight for the seminar participants in that they were able to see how some effort and ingenuity could be used to examine students for the attainment of some of the major objectives of instruction.

As we considered the problem of evaluating the student we began to enlarge our definition of what an examination is. An examination is a systematic method of determining the extent to which students possess particular desired characteristics. We began to conceive of closed book as well as open book examination problems, essay as well as objective type questions, student products as well as answers to questions, observation of the student in the classroom and laboratory as well as the answers to questions in an examination hall—all became possible methods of examining students. The methods of examining the student are valid if they can be used to determine the extent to which he has achieved the desired objectives of instruction. Some of the variety of possible evaluation methods are illustrated in *Part* III of this book.

Many of the participants pointed out that these new kinds of problems required students to prepare for examinations in different ways than was traditional. This led, rather naturally, to our fourth question "What types of learning experiences would best help the students to achieve these objectives?" Here the faculty participants in the seminars were very creative in suggesting the kinds of interaction between teachers and students, between students and material, and between students and the problems of the subject field which are likely to be most effective in helping students to develop in the desired ways. Thus, some of the participants suggested that the ability to apply principles to new problems would be best developed if students are actually given experience in attacking new problems and are helped to recognise when and why they are successful in solving these problems as well as in locating their difficulties in applying principles. Others suggested that skill in interpreting and analyzing data could be developed if students are actually confronted with new data and are asked to interpret such data with help being given to aid the student when he needs it.

Many other suggestions were made as to the kinds of learning experiences which would be most effective for the different objectives. It was of great interest to the group when several radically different proposals were made for the learning of the *same* objective. It was soon evident to the group that some method would have to be used to determine whether one proposal was superior to the others or whether several proposals for learning experiences might be equally good. One way of resolving the dilemma arising from mutually exclusive proposals is to determine whether each proposal gives the student an opportunity to engage in learning experiences relevant to the major objective. Another method is to use the evaluation evidence and techniques to actually determine whether students develop the appropriate types of competence, etc., better under one set of procedures or another. Perhaps one of the greatest benefits arising from the development of improved examination techniques is that education can move from long and bitter debates about the possible merits of one type of learning versus another, to a realistic and pragmatic determination of the relative merits of different educational views and practices. *Do students really grow more or develop better types of learning outcomes under programme X or Y, should be the question to be answered rather than can I persuade someone that programme X is better than programme Y.*

As we considered these points in great detail it became evident that evaluation evidences could be very helpful to the teacher not only in determining the relative merits of different types of learning experiences

but also to help determine which learning experiences are working well and which are not. If the results of examinations can be summarized in such a way as to show which topics or subject matter are being learned well and which are not, or which objectives are being achieved by students and which are not, the teacher has a powerful source of evidence for the continual improvement of his teaching and the students learning.

The group also discussed the effect of examinations on the ways in which students learn. The seminar participants pointed out that at present students reject new methods of teaching and learning because they cannot see clear relationships between such learning experiences and the external examinations they will have to take. If new types of examinations require new types of learning, students will be highly motivated to learn in the new ways. If the examinations require more than superficial knowledge of the subject, students are likely to learn what is required. If some portions of the examination are of the open book type in which students are permitted to use their notes and books—and the questions require the students to do more than simply remember the notes—it is likely that students will study and prepare in different ways than if they believe the only purpose of learning is to give evidence of memory of notes and books.

If the questions used on examinations require the students to think about significant problems in contemporary life, then learning will be different than when they are only required to remember notes and books studied in the courses. The participants were very much aware of the effect of examinations on the problem of bridging the gap between the learning that goes on in the Universities and the vital problems in the environment in which the students live.

As the careful reader has probably already noticed I do not think the problem of examination reform can be separated from the fundamental educational problems of India. On the other hand, the thinking required to deal with examination reform has tremendous implications for all other aspects of university education in India. I have been much encouraged by the ways in which faculty members are able to approach these problems and I am confident that, if the opportunities are made available, the university professors of India will be able to meet the challenge of developing the type of higher education which will help to produce the kinds of educated men and women India needs so desperately to solve its problems of the present and future. Such a university education will help to develop men and women who will rise to the highest level of which they are capable.

INTRODUCTION TO ILLUSTRATIONS OF OBJECTIVES AND EVALUATION TECHNIQUES

The following material is intended to be illustrative and is not intended to define what should be done in each field. The seminar participants listed a large number of possible educational objectives in each subject field. This list was reduced to a much smaller number of objectives by various attempts on the part of the participants to determine the objectives on which they most fully agreed. It is likely that there are other objectives equally important with the ones listed here.

From the longer list of objectives, the seminar participants selected a few for further definition. The behaviour suggested for each of these objectives represents one way of defining the objective in behavioural terms.

The seminar participants then attempted to write a few illustrative examination problems which they believed would yield evidence on the student's attainment of the objective and behaviours. Although these have been discussed by the seminar groups, each illustration represents the work of a committee of two or more persons and does not represent the work of the entire group. Most of the problems constructed by the participants were of the essay type. Although many of the participants expressed an interest in constructing objective questions, our time was too limited to permit the care and attention required to make sound recognition type questions.

The collection of test problems used at the University of Chicago was studied to find test problems which were relevant to the objectives listed by the Indian university professors. These, of course, were not intended for this use and many of the illustrations may be at an inappropriate level of difficulty or complexity. Others may not treat the subject matter in precisely the way it would be taught and learned in an Indian university. It is to be hoped, however, that the reader may see in these illustrations something of the variety and scope presented by well constructed recognition examination problems.

However, the final issue is not essay questions versus recognition forms

of questions. Both are useful in their place as are many other types of examinations. The central concern in all achievement examining should be the development of methods of examining which evaluate the students' achievement of the *major objectives of learning.*

ECONOMICS

OBJECTIVES

1. The student will develop the ability to recognise the economic process as it relates to specific new situations.
2. The student will develop the ability to apply economic knowledge to problems of economic policy.
3. The student will develop the ability to establish cause and effect relationships in economic phenomena.
4. The student will develop skill in analysing economic data and in conducting economic investigations.
5. The student will develop the ability to recognise inter-relationships among different parts of the subject.
6. The student will be able to identify the major ideas and assumptions in economic theories.
7. The student will develop the ability to form informed judgements regarding economic policies as they affect the citizen.
8. The student will develop skill in identifying the implications and consequences of economic policies on social change.
9. The student will develop intellectual curiosity and the spirit of inquiry in relation to economic phenomena.

OBJECTIVE

THE STUDENT WILL DEVELOP THE ABILITY IT RELATES TO SPECIFIC

BEHAVIOUR

The student can:

(1) analyse the problems of production and distribution.

(2) comprehend the effects of different economic situations on economic organisation.

(3) recognise the effects of economic organisation on economic efficiency and social relationship.

ESSAY FORM

1. In what ways does the Indian economic system differ from the Soviet system ? How would the following be different under the two systems ?
   (a) production of automobiles,
   (b) use of automobiles,
   (c) determination of prices of consumer's goods,
   (d) wages.
2. What is the nature of an economic problem ? How does it arise ? Is there an economic problem in the following cases:
   (i) fighting a war,
   (ii) construction of dams,
   (iii) house building,
   (iv) preparation for an examination.
3. What is capital formation ? Do the following activities lead to capital formation ?
   (i) hoarding of savings,
   (ii) increase in bank balance,
   (iii) investing in Government Loans.
   (iv) building a house for yourself,

1 RECOGNITION FORM

TO RECOGNISE THE ECONOMIC PROCESS AS NEW SITUATIONS

(4) recognise the effects of the social context on the significance of particular economic facts and principles.

(5) appreciate the major points of similarity and difference between two economic systems.

RECOGNITION FORM

DIRECTIONS: For each of the following items, *blacken* answer space

A— if the statement applies to the *Soviet state* only;

B— if the statement applies to the *Democratic state* (e.g. the United States) only;

C— if the statement applies to both the *Soviet state* and *the Democratic state;*

D— if the statement applies to within the *Soviet state* or the *Democratic state.*

1. The written constitution states that the individual citizen possesses the right of free speech and freedom of conscience.
2. The state owns and manages the means of production.
3. A wide variety of voluntary organizations with diverse and conflicting aims on economic, political, and religious matters exist in this type of state.
4. The media of communication (press, cinema, radio, etc.) are under the strict and uniform control of the government bureaucracy.
5. The "Industrial Revolution" was carried out very rapidly under the leadership of a single, disciplined, political party.

Objective 1

(v) endowment for the college building.

4. How does the institution of caste affect economic activity? What have been the effects of introduction of new methods of transportation and industrialization on the Caste System?

5. Discuss the effects of the laws of inheritance and succession on (i) ownership of land, (ii) cultivation of land, (iii) capital accumulation, (iv) distribution of wealth?

6. What are the consequences of nationalization of an industry?

ESSAY FORM

SHOULD THE FOLLOWING BE NATIONALIZED? (i) commercial banks, (ii) textile industry, (iii) foreign trade? Give reasons.

7. What are the elements of monopoly in the economic system under which you live? Is monopoly an evil? What are the kinds of monopoly which the state should permit?

8. What is quasi-rent? Point out the rent-like elements in the earnings of the following:

(i) a wholeseller dealing in foodgrains during a period when prices of foodgrains are rising,

(ii) technicians and experts,

(iii) typists and clerks who work overtime,

(iv) ships during a period of war.

(*Continued*) RECOGNITION FORM

OBJECTIVE

THE STUDENT WILL DEVELOP THE ABILITY TO ECONOMIC

BEHAVIOUR

The student can:

(1) analyse the problems of economic policy.

(2) recall facts, principles, laws, etc. relevant (to the problems of economic policy) and analyse them.

(3) identify the relationships between the facts, principles, etc. and the problems of economic policy in question.

(4) formulate a tentative hypothesis, suggest a remedy or study a possible course of action.

ESSAY FORM

Give a brief explanation of the concept of elasticity of demand?

In the following table are given prices of certain commodities together with total outlay in the case of each in a town.

Commodity	*Price*	*Total outlay per annum (In thousands of Rs.)*
Rice	Rs. 28/– per md.	340
Bajri	Rs. 16/– per md.	192
Fruit and vegetables	Rs. 3/– per dozen	120
	00.37 per lb.	162
Petrol	Rs. 3.75 per gallon.	54

2 RECOGNITION FORM

APPLY ECONOMIC KNOWLEDGE TO PROBLEMS OF POLICY

(5) test the hypothesised remedy or course of action in the given situation.

(6) determine the sufficiency or insufficiency of the data for explaining the problem in question.

(7) apply the facts or principles chosen (to the problems of economic policy analysed) to explain or predict.

RECOGNITION FORM

DIRECTIONS: A leading economist asserts that a change in long run underlying conditions (wants, resources, technology) will produce a change in the long run price and|or quantity. In the following items you are to judge whether the change mentioned is of such a character, and if so, what its effects on price and quantity of a particular product will be. Assume that the industry referred to is perfectly competitive and is subject to increasing costs. Assume that no change takes place other than that mentioned in or directly implied by the statement. *Blacken* answer space.

A— if the stated change will cause *both* long run price and quantity produced to *increase;*

B— if the stated change will cause *both* long run price and quantity produced to *decrease;*

C— if the stated change will cause long run *price to fall* and *quantity produced to increase;*

D— if the stated change will cause long run *price to rise* and *quantity produced to decrease.*

1. Development of a new substitute for the product
2. Development of a new use for the product

Objective 2

ESSAY FORM

1. (Assuming that there are 2000 families with 6 members in a family on an average) interpret the above data.

2. If the prices of above commodities rise by 2% OR fall by 5% all over, what will be the effect on total outlay?

3. (a) If the price of petrol, fruit, and rice go up by 5% OR (b) If the price of petrol and rice go up by 10% what will happen to demand for all the commodities?

Explain :—

(i) the quantity of money increased in India during the first two years of the Second Plan, the rates of interest were however, rising.

(ii) cottage industries provide employment, they are however regarded as unnecessary for economic development in India.

(iii) optimum firms in U.S.A. are normally larger in size than those in Japan.

(iv) wages of labour in India are lower than those in the U.K.

(v) the national income in India rose by 6% during the First Five Year Plan, savings are however not rising.

(*Continued*) RECOGNITION FORM

3. Monopolization of the industry producing the product
4. A redistribution of income favouring the groups to whom the product has a high marginal utility
5. An increase in money wage rates in the industry producing the product
6. An invention increasing the productivity of labour in the industry
7. Discovery of a new, practical source of supply of raw materials
8. The product becomes less fashionable

DIRECTIONS: In the following items you are to judge the effects of a particular policy on the distribution of income. In each case assume that there are no other changes in policy which would counteract the effects of the policy described in the item. For each item *blacken* answer space.

A— if the policy described would tend to *reduce* the existing degree of inequality in the distribution of income;

B— if the policy described would tend to *increase* the existing degree of inequality in the distribution of income;

C— if the policy described would have no effect, or an indeterminate effect, on the distribution of income.

1. Increasingly progressive income taxes
2. Confiscation of rent on unimproved urban land
3. Introduction of a national sales tax
4. Increasing the personal exemptions from income taxes
5. Distributing a subsidy to share croppers on Southern farms
6. Provision of educational and medical services, and low cost public housing
7. Reduction in the degree of business monopoly
8. Increasing taxes in periods of prosperity and decreasing them in periods when depressions threaten

Objective 2

RECOGNITION FORM

DIRECTION: For items 9 to 14 dealing with compensatory policies, assume an economic and political order similar to the contemporary USA. *Blacken* answer space.

A— if the item refers to a policy which, under favourable conditions of application, may be expected to *counteract a recession and to promote recovery;*

B— if the item refers to a policy which, under favourable conditions of application, may be expected to *counteract or restrain a strong boom* and thereby to prevent, postpone, and mitigate a subsequent depression;

C— if the item refers to a set of policies, which under favourable conditions of application and with appropriate changes in direction, may be expected to *counteract both recessions and booms;*

D— if none of the above applies (e. g., the policy may be internally inconsistent).

9. Reducing the ratio of public expenditure to public revenue as general business conditions improve and increasing the ratio when general business conditions decline

10. Reduction of discount and rediscount rates

11. All investments (other than changes in inventories) require permits issued by a federal investment board

12. Lowering of tax exemptions in the federal personal income tax

13. Use of a budget surplus to reduce the public debt by means of Treasury purchases of outstanding government securities held by the general public

14. Use of a budget surplus to reduce the public debt by means of Treasury purchases of outstanding government securities held by the Federal Reserve Banks

DIRECTIONS: For the following items *blacken* the answer space (s) corresponding to the letter (s) of the correct answer (s) or completion (s).

15. Each type of stabilization policy is subject to certain limitations or

(*Continued*) RECOGNITION FORM

objections. Which of the following is a valid statement of such limitations of or objections to the kinds of policies mentioned?

A— changes in fiscal policies are slow to institute and policies designed for one phase may become effective only in the next phase.

B— Business and labour groups are likely to raise powerful objections to tax increases and tight money policies.

C— Monetary authorities are subject to errors because of ambiguities in the interpretation of the over-all business outlook.

D— All of the above

E— None of the above

16. Debate is currently under way about the new (1960) budget. Considering both short-run stabilization policies and long-run problems of increasing the average annual rate of growth, which one of the following is *not* a plausible argument in support of balancing the budget by a slight increase in revenue and a cut in federal expenditures?

A— Federal deficit spending in the next year would increase the danger of inflation.

B— Business is on the upswing and remaining unemployment is bound to be reduced by forthcoming business expansion.

C— The real cause of persistent unemployment and creeping inflation is to be found not in a small federal deficit, but rather in the monopolistic practices of business and labour groups.

D— An increase in federal expenditures significantly in excess of prospective revenue contributes to the economic and political dangers of a large and rising public debt; to raise taxes is politically unfeasible and economically undesirable.

E— None of the above, since all of the above arguments *support* budget-balancing policies for the coming year.

17. Considering the present (April, 1959) situation of increasing income, output, sales and profits, combined with 6-7% unemployment, which of the following is a valid argument against the President's determination to balance the new budget?

A— The continuation or expansion of existing federal expenditure

Objective 2

(*Continued*) RECOGNITION FORM

programmes with relatively rapid impact can reduce unemployment significantly via the multiplier effect.

B— Unless there is also a too "easy money" policy, a small federal deficit, by itself, is not likely to have major inflationary consequences in light of the present rate of unemployment and idle plant capacity.

C— An expansion of national income, stimulated by deficit spending, will increase revenues and thus partially reduce the deficit.

D— All of the above.

E— None of the above.

III: Inflation

18. Which of the following is a correct interpretation of the term "inflation" as used in present discussions?

A— An increase in the general or average price level and a decrease in the purchasing power of money

B— Any increase in the total income of consumers, business and government available for spending

C— An increase in every particular price of factors of production or of products

D— All of the above are included in the definition of inflation

E— None of the above is a correct definition of inflation

OBJECTIVE

THE STUDENT WILL DEVELOP THE ABILITY TO IN ECONOMIC

BEHAVIOUR

The student can:

(a) take into consideration the assumed conditions which form the background of the phenomenon to the investigated

(b) observe correctly and define the various elements of the phenomenon regarding which the relationship has to be established

(c) recognize the variations in the phenomenon and their consequences

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ESSAY FORM

(1) In a market when the price of mangoes is Rs. 2 per dozen, 1000 mangoes are sold, and when the next day price falls to Rs. 1.50 the sale of mangoes increases to 1300.

(i) How will you account for this phenomenon ?

(ii) What economic law is involved in this situation ?

(iii) Explain the law with illustration of three other commodities.

(iv) In the operation of this law, what other factors have you assumed to be constant ?

(v) Can you imagine a situation or situations wherein with a fall in price, the demand for mangoes will not increase ? OR with a rise in price, the demand will not diminish ?

(2) If atomic energy is introduced into the cotton-textile industry, what possible effects will follow under different situations you can imagine ?

3 RECOGNITION FORM

ESTABLISH CAUSE AND EFFECT RELATIONSHIPS PHENOMENA

(d) formulate an hypothesis concerning the phenomenon in question

(e) verify the hypothesis with reference to new facts

(f) distinguish between valid and invalid conclusions by establishing the conditions that cause the phenomenon under investigation

(g) realize the limitation of the application of scientific methods to economic phenomenon

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RECOGNITION FORM

DIRECTIONS: In recent discussion two different types of inflationary processes have been distinguished:

Type A	*"demand-pull"* or *"buyer's inflation"*	characterized by increases in total expenditures as the initiating and strategic factor
Type B	*"cost-price-push"* or *"seller's inflation"*	characterized by increases in wages or other costs as the initiating and strategic factor and sometimes by price increases without prior increases in costs

In answering the following items, assume (i) monetary conditions enabling the process to be realized and (ii) the absence of offsetting decreases in prices or wages elsewhere in the economy. For each item, *blacken* answer space

A— if the item refers to a characteristic, cause, or consequence of *Type A* inflation;

B— if the item refers to a characteristic, cause, or consequence of *Type B* inflation;

C— if the item is applicable to *both* Types A and B inflations;

D— if none of the above applies.

Objective 3

1. Wage rates increase and product prices rise both in unionized and in non-unionized sectors of the economy.

2. The process starts with an improvement in profit expectations; output, employment and national income expand; this leads to cumulative increases in the value of the marginal product of labour in most industries, but the average physical productivity of labour changes relatively little.

3. Money wage rates increase, but in no industry do they increase by more than the increase in the average productivity of labour in the economy as a whole.

4. Inflation of this type can occur when and only when important labour markets and product markets are *not* subject to the "discipline of competition," as described by Simons.

5. Real wage rates of workers who were already employed at the beginning of the process, may increase slightly but more often remain constant or decrease somewhat.

6. In inflation of this type, price and wage increases can continue even though unemployment is increasing.

DIRECTIONS: For each of the following items, *blacken* the answer space (s) corresponding to the letter (s) of the correct answer (s) or completion (s).

7. Assuming that the distinction in types of inflation is valid, and that the two processes can occur either separately or together, which *two* of the following best support the view that the emergence of strong business and labour organizations has made the problem of "creeping inflation" more serious in the USA than it was earlier? (*two* answers)

   A— If prices are not merely pulled up, but are also pushed up, a given increase in MV_0 (= GNP) will result in less expansion of, perhaps even a reduction in, output and employment, than would occur without price pushes.

   B— From a long-run point of view, one of the most important factors is the "downward" rigidity of prices and wages administered by strong organizations, and thus the increased improbability that

(*Continued*) RECOGNITION FORM

advances in the general price level will be reversed either as a consequence of recession or of improvements in productivity.

C— From 1945 to November 1958 the level of consumer prices has risen by nearly 75%.

D— As Slichter has shown, we live in a labouristic economy.

E— As both Simons and Galbraith have shown, at least implicitly, unions are both monopolistic and inflationary; they are necessarily so in effect, even if not in intention.

DIRECTIONS: As the preceding analysis has suggested, problems of employment and price stability also involve questions concerning the structure of the free enterprise economy, i.e., competition and monopoly. For each item *blacken* the answer space (s) corresponding to the letter (s) of the correct answer (s) or completion (s).

8. Which of the following states a condition—or a predictable consequence—of competition, defined in a strict sense?

A— Rational pursuit of the economic interest of each economic unit.

B— Formal and effective freedom of entrance into a market.

C— Multiplicity of independent units each of which is relatively small compared to the markets in which it operates.

D— All of the above are either conditions or consequences of competition.

E— None of the above is a condition or consequence of competition.

9. Which of the following is *not* a condition or predictable consequence of competition, defined in a strict sense?

A— Inability of a unit to influence market price by its own decisions about output and inability to pursue a "price policy" of its own.

B— Absence of "product differentiation" and of similar non-economic differentiations in factor markets.

C— Absence of all voluntary organizations in economic life.

D— Prices tend to equal the additional cost incurred by a firm in producing the last unit of output, i.e., marginal cost.

E— In the long run, prices tend to equal minimum average cost of production.

Objective 3

10. From this theory of a thoroughly competitive market system, it follows that with given amounts of productive services, given technology and given tastes,

A— transition to a more competitive market structure would benefit the general consumer with respect to the level of want satisfactions achieved.

B— introduction of price and quantity controls would result in social losses by creating excess demand or excess supply.

C— income distribution under competition would be more unequal than under almost any conceivable deviation from the competitive pattern.

D— A and B above are true, but C is not.

E— A and C above are true, but B is not.

DIRECTIONS: The following items deal with different aspects, conditions and consequences of "economic freedoms", and with policies affecting those freedoms. The items listed on the left side (under the heading "Factors") are to be compared with respect to the two different sets of conditions, listed under *"Conditions A"* and *"Conditions B"* respectively. You are to judge under which condition the factor is more important. Opposite the number of the factor, *blacken* answer space.

A— if the size (quantitative importance) of the factor under discussion is *greater under* conditions *A than under* conditions *B;*

B— if the size (quantitative importance) of the factor under discussion is *greater under* conditions *B than under* conditions *A;*

C— if the size (quantitative importance) of the factor under discussion is *equal* for conditions A and B or if it is *not determinable* on the basis of the given definitions and assumptions.

Note: You are to make your answers on the answer sheet. If not otherwise stated or necessarily implied, it is assumed that the level of technology is the same for condition A as for condition B.

(*Continued*) RECOGNITION FORM

Factor	*Conditions A*	*Conditions B*
1. formal freedom* of a consumer to choose the distribution of his income among different lines of want satisfaction	in an all-round perfectly competitive market	in a market the supply side of which is organized in a small number of large independent firms
2. effective freedom** of a consumer to maximize his want satisfaction with given income and want structure	in an all-round perfectly competitive market	in a market the supply side of which is organized in a small number of large independent firms
3. effective freedom of a new firm to enter any market	in an all-round perfectly competitive market	existence of patent monopolies and/or cartel agreements
4. effective freedom of a worker to refuse to work under inadequate working conditions prevailing in a particular plant	in an all-round perfectly competitive labour market	under imperfectly competitive conditions concerning the hiring of labour, assuming no government interference or trade union organization

* *Formal freedom* : a person (or group) is formally free to perform an action when the performance (or non-performance) of that action is *not* followed by a sanction, i.e., an action on the part of others with the intent to punish that person (or group) for the performance (or non-performance) of that action or for the attempt to perform it.

** *Effective freedom* : a person (or group) is effectively free with respect to a certain action if that person (or group) is, with respect to that action, formally free *and if in addition* conditions exist which give him an opportunity to exercise the freedom.

Objective 3

(*Continued*) RECOGNITION FORM

Factor	*Conditions A*	*Conditions B*
5. mobility of labour	in an all-round perfectly competitive labour market	under imperfectly competitive conditions concerning the hiring of labour, assuming no government interference or trade union organization
6. mobility of labour.	in an all-round perfectly competitive labour market	prevalence of closed shops with closed union lists
7. inequality of income distribution (assuming no direct or indirect income redistribution policies on the part of the government)	in an essentially competitive system	in an economic system characterized by predominance of large-scale business units, cartels and craft unions
8. size and political importance of pressure groups	in an essentially competitive system	in an economic system characterized by predominance of large-scale business units, cartels and craft unions

OBJECTIVE

THE STUDENT WILL DEVELOP DATA AND IN CONDUCTING

BEHAVIOUR

The student can:

(a) collect and interpret data bearing on economic phenomena.

(b) trace inter-relationship between economic variables and establish casual connection, if any, between them.

(c) use techniques for conducting independent investigations and surveys and draw conclusions from them.

ESSAY FORM

1. Economic variables are changing in the following manner over a period of 5 years in India.

Q or M	production index	wholesale price index	Balance of payments
1952			
1953	(Data to be supplied by Committee on Economics)		
1954			
1955			
1956			

Analyse these statistics and find out the casual relationship, if any, between the variables.

2. Suppose you wish to find out the socio-economic conditions of the workers in textile mills. Prepare a questionnaire for the purpose.

3. Suppose you wish to study the changes in the volume and direction of foreign trade of India during the last three years. What will be the sources of your information and how would you compute the balance of payments of India over this period?

4. Suppose eight crores of people from the agricultural sector of India migrate to other countries. Trace the repercussions of this on the economic life of the Indian people.

4 RECOGNITION FORM

SKILL IN ANALYSING ECONOMIC ECONOMIC INVESTIGATIONS

(d) construct theoretical models.
(e) recognise the assumptions underlying the models.
(f) verify the theoretical principles and the conclusions following from these models in field work.
(g) apply the conclusions drawn from theoretical analysis and field work to problems of practical life.

RECOGNITION FORM

The following items deal with the determination of output and price by an individual firm operating under different sets of conditions. Unless explicitly directed otherwise, make the following *general assumptions*:

i. The firm produces only one product which is the same under all conditions. Fixed costs for the firm are $ 75.00.
ii. The firm acts rationally, i.e., it aims at the maximization of current profits and the minimization of current losses.
iii. The term "profits" is here used to mean receipts in excess of total costs which include a normal return on owner's capital and labour invested in the industry.
iv. If profits or losses are the same for two consecutive amounts of output, the firm chooses the larger output.
v. Neither the government nor a cartel fixes either price or output.

DIRECTIONS: For each item, *blacken* the answer space corresponding to the letter of the *one best* completion.

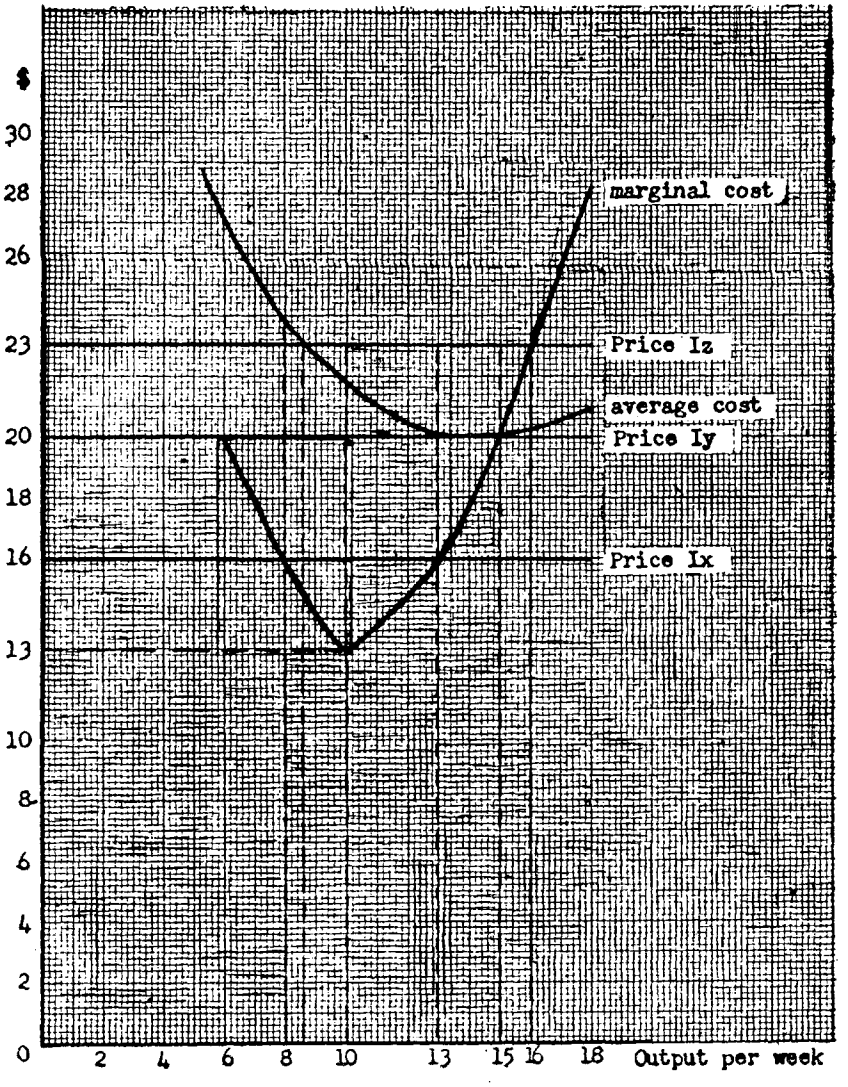
See Graph Next Page

Graph I indicates that the firm, under price conditions Ix, sells its product

A— under perfectly competitive conditions.

B— under imperfectly competitive conditions.

Objective 4


$
30
28
26
23
20
18
16
13
10
8
6
4
2
0
2
4
6
8
10
13
15
16
18
Output per week
marginal cost
Price Iz
average cost
Price Iy
Price Ix

(*Continued*) RECOGNITION FORM

C– under either set of conditions.

D– under neither set of conditions.

1. At the price Ix ($ 16 per unit), the firm will produce

A– nothing.

B– 8 units.

C– 10 units.

D– 13 units.

E– 15 units.

2. Selling its output at the price Ix, the firm will

A– make profits.

B– incur losses.

C– break even.

3. At the price Iy ($ 20 per unit), the firm will produce

A– 8 units.

B– 10 units.

C– 13 units.

D– 15 units.

E– none of the above amounts.

4. The equilibrium position indicated by your answer to item (4) represents

A– a short run equilibrium only.

B– a long run equilibrium only.

C– both a short and a long run equilibrium.

5. At price Iz ($ 23 per unit), the firm will produce

A– less than at price Ix or price Iy.

B– more than at price Ix or Iy.

C– more than at price Ix but less than at price Iy.

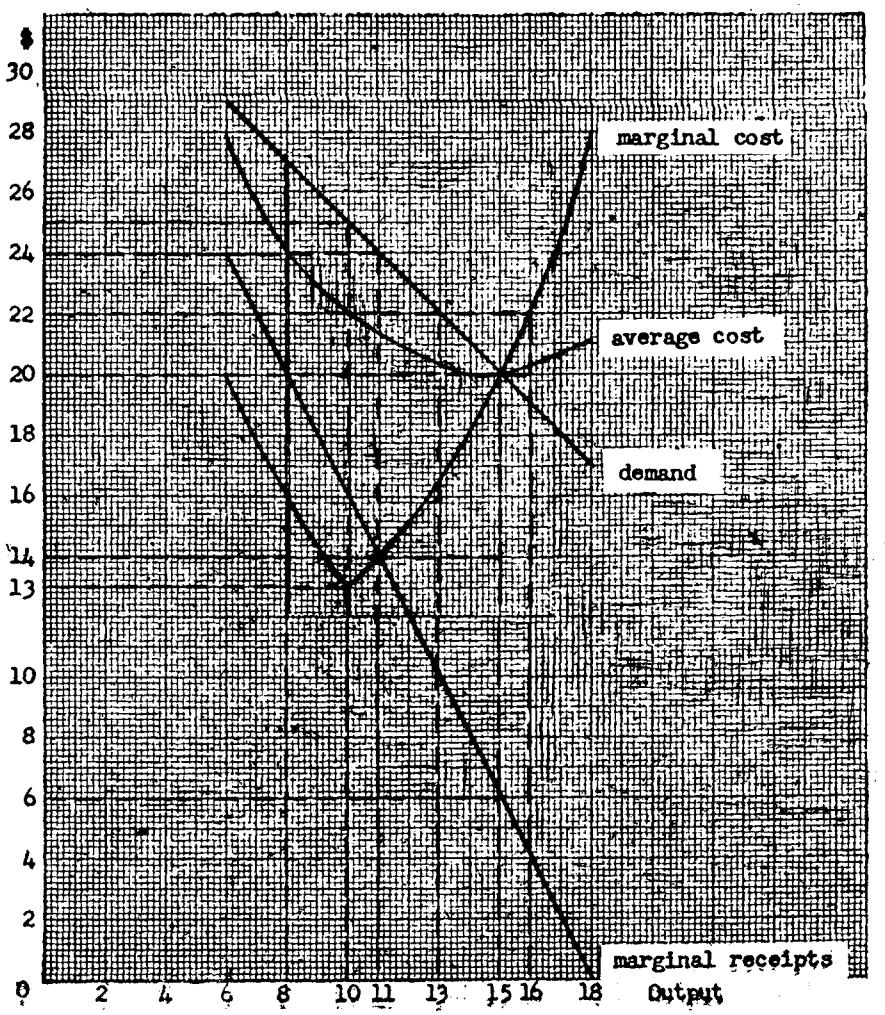
D– less than at price Ix but more than at price Iy.

E– an indeterminate amount.

Objective 4

DIRECTIONS: Assume now that the firm operates under cost and demand conditions described in Graph II. For each item, *blacken* the answer space corresponding to the letter of the *one* correct completion.

GRAPH II



(Continued) RECOGNITION FORM

1. *Graph II* differs from *Graph I*

   A— only with respect to the cost conditions for the firm's output.

   B— only with respect to the demand conditions for the firm's output.

   C— both with respect to the cost and the demand conditions for the firm's output.

   D— in that in Graph I price is given but demand for the firm's output is not given, while in Graph II demand for the firm's output is given but price is not.

2. *Graph II* indicates that the firm sells its output

   A— under perfectly competitive conditions.

   B— under imperfectly competitive conditions.

   C— under either perfectly or imperfectly competitive conditions.

   D— under neither perfectly nor imperfectly competitive conditions.

3. The firm will now produce

   A— less than 10 units.

   B— 10 units.

   C— 11 units.

   D— between 11 and 15 units.

   E— 15 units.

4. The firm will charge a price

   A— of $ 25.

   B— of $ 24.

   C— of $ 20.

   D— of $ 14.

   E— none of the above.

Objective 4

5. The firm will

A— make profits.

B— incur losses.

C— break even.

Assume that the firm is in long-run equilibrium. Your answers to items 3 and 4 indicate the entrance of new firms into the industry

A— unrestricted.

B— restricted.

C— either restricted or unrestricted.

D— neither restricted nor unrestricted.

6. The consumers who buy the product in question under conditions represented by Graph II are :

A— better off than consumers who buy it under conditions represented by Graph I.

B— worse off than consumers who buy it under conditions represented by Graph I.

C— neither worse nor better off than consumers who buy it under conditions represented by Graph I.

Note : Until further notice, assume now

vi. that the firm in question is one of 10 firms which operate under the same cost and demand conditions as those given in Graph II.

vii. The cost conditions for each firm and the fundamental demand conditions underlying Graph II remain constant for this market irrespective of the presence or absence of government regulation.

7. If the government imposes upon all 10 firms a maximum price of $22, each firm will produce and attempt to sell

A— 10 units (total output 100 units).

B— between 10 and 13 units.

C— 13 units (total output 130 units).

D— between 13 and 16 units.

E— 16 units (total output 160 units).

(*Continued*) RECOGNITION FORM

8. At the price of $22, the customers of all 10 firms together will demand demand

A— 100 units.

B— 130 units.

C— 160 units.

D— none of the above amounts.

E— an indeterminate amount.

9. If the government fixes the maximum price at $20, all 10 firms together will produce a total output which will be

A— larger than the total quantity demanded.

B— smaller than the total quantity demanded.

C— equal to the total quantity demanded.

10. At the maximum price of $20, each firm will have receipts

A— larger than its total costs.

B— equal to its total costs.

C— smaller than its total costs.

OBJECTIVE

THE STUDENT WILL DEVELOP THE ABILITY AMONG DIFFERENT

BEHAVIOUR

The student can :

(a) discern the relationship between economic theory and economic history.

(b) understand the current economic theory in terms of its evolution.

ESSAY FORM

(1) Under what historical circumstances was the theoretical doctrine of laissez-faire developed ?

(2) How was the phenomenon of the business cycle explained by– (i) the classical economists (ii) Jevons (iii) Keynes ?

(3) Discover the favourable and unfavourable factors in the Indian social life which render the objective of a "Socialistic pattern of society" desirable and realisable.

Essay Question

DIRECTIONS: The essay consists of four main questions on the following paragraph. Read it carefully and then read all the questions, before you attempt to answer any of them. In answering the questions, refer to relevant authors read in the course. In matters of policy you will not be judged on the basis of your preference, but (as in other parts) with respect to the *consistency, scope* and *formal adequacy* of your discussion. While this entire essay should form a connected whole, you are required to divide it into the four main sections indicated by the questions. Be sure that your answer to each question is placed on the proper page.

"The difficult but essential task which confronts all democratic societies today may be formulated as follows: how in practice to curtail the freedom of the individual in economic enterprise sufficiently to effect that equality of opportunity and of possessions without which political democracy is an empty form, and at the same time to preserve that measure of individual

5 RECOGNITION FORM

TO RECOGNISE INTER-RELATIONSHIPS PARTS OF THE SUBJECT

(c) understand the evolution of various economic systems as historical categories.

(d) discern the appropriateness of economic policies under different historical conditions.

RECOGNITION FORM

DIRECTIONS: Between different types of liberals and socialists there are both major disagreements concerning economic policies. The agreements and disagreements are concerned with either (i) basic *preferences,* or (ii) *factual assumptions* about existing conditions and the practicability of certain policies, and (iii) *both* preferences, and factual assumptions. In the items which follow you are to judge which preference (s) and which factual assumption (s) are referred to.

Basic Preferences

A— The most desirable goal of policy is the maximization of *formal freedoms* for individuals and associations of individuals and the corresponding minimization of governmental functions;

B— *Effective freedoms* should be maximized; they should be distributed as evenly as is compatible with the chief goal; if an increase in government functions is necessary to increase effective freedoms in the society at large, such extension of organized managed coordination is justified;

C— The main task is maximization of physical and psychic *security* for the broad masses of the population; this implies a high degree of equalitarianism; the achievement of the main goal justifies the sacrifice of formal *and* effective freedoms of producers and consumers;

D— The ideal goal is a *compromise* between the positions B and C above; the concerns for a maximum security and a maximum

Objective 5

freedom in intellectual and political life without which it cannot exist... Can the flagrant inequality of possessions and opportunity now existing in democratic societies be corrected by the democratic method? If it cannot be so corrected, the resulting discontent and confusion will be certain, sooner or later, to issue in some form of revolutionary or military dictatorship. This then is the dilemma which confronts democratic societies: to solve the economic problem by the democratic method, or cease to be democratic societies." (Carl L. Becker, *Modern Democracy,* 1940)

I. What evidence can you present either to support or deny Becker's basic propositions:

   (a) that the existing "freedom of the individual in economic enterprise" is incompatible with more "equality of opportunity and of possessions" than we now have.

   (b) that "the flagrant inequality of possessions and of opportunity now existing in democratic societies" results in making political democracy "only an empty form."

II. In what respects does Becker's view of the *requirements* of a stable democracy for the twentieth century differ from the programme of most liberal or democratic writers of 100-200 years ago, and in what respects is it similar? Explain briefly the differences between conditions of society then and now which would help to account for the differences between the formulations of the problem in the 18th and 19th centuries and those of the 20th century.

III. Becker implies that, if we adopt the measures necessary to reduce economic inequality, these measures may have the additional result of endangering "individual freedom in intellectual and political life without which" democracy "cannot exist."

   (a) What are the intellectual and political liberties to which he is referring, and why are they indispensable to democracy? Are there any grounds for the belief that solution of our economic problems may endanger these liberties? Why? To what evidence in the contemporary world might Becker point in support of of his belief?

   (b) In what way would you criticize Becker's formulation of the problems of democracy? What dangers or issues other than those

(*Continued*) RECOGNITION FORM

of effective freedoms of the masses of producers and consumers ought both to limit and to support each other;

E– Neither freedom nor economic security of the masses is important; what counts is the maximization of the political *power* of the state and of its ruling élite.

Factual Assumptions

A– Monopoly is, in part, caused by direct government interference in the economic process, but chiefly it is caused by inevitable and irreversible technological trends favouring increasingly large technical and economic units; to destroy monopoly implies the destruction of efficient and independent private enterprise;

B– Monopoly is the "natural" outcome of human acquisitiveness and of rules of the game permitting and encouraging profit maximization;

C– It is possible to maintain or restore workable, automatically operating competition between privately owned and operated economic units, with the exception of the fields of transportation, communication, and power;

D– It is possible to maintain or restore workable private competition in important areas of the economy, but in a sector much larger than that envisaged in position C the social-economic benefits of effective competition cannot be realized without either a continuous and sharp governmental regulation of private units or the increasing use of public enterprises whose output and investment decisions are market-oriented, but made and co-ordinated on the basis of other principles than that of profit maximization.

E– Monopolistic concentration of private economic power is largely the product of the essential instability of private capitalism and therefore can be overcome only by a rigorous and comprehensive planning of all phases of the economy, production as well as consumption. In such a system all kinds of market operations will have to be absent or could exist only as a relic within very narrow limits.

which he mentions do you consider equally or more crucial for the survival of democracy?

IV. In your opinion, is it likely or unlikely that the United States will surmount the problems you regard as most important (question III) "by the democratic method"? List briefly

(a) the factors or forces which seem to you to make this outcome likely, and those which seem to you to point toward stalemate, civil war, or dictatorship.

(b) the policies which you consider essential to a democratic solution of the problems you have listed as critical.

(*Continued*) RECOGNITION FORM

RECOGNITION FORM

DIRECTIONS: In the following items, blanks are left to indicate the *number* of correct answers. *The blanks are left only for your convenience. The items are to be answered on the answer sheet.* Opposite the number of the item *blacken* the answer space (s) corresponding to the letter (s) of the preference (s) or factual assumption (s) which would correctly complete the item.

1. Proponents of democratic socialism

2. base their policies on *preference*————.

3. They *agree* with Simons in accepting the *factual assumption*————.

4. But while liberals like *Simons* accept it, democratic socialists *reject factual assumption*————.

5. Socialists of *this* type base their recommendations of policy on a certain version of *factual assumption*————.

III. The most extreme *totalitarian socialists*

6. are most likely to favour *preference*————.

7. They differ from both the previous positions (I and II) discussed by adopting the *factual assumption* ————.

IV. *Other socialists* who stand between democratic socialism and the extreme totalitarian socialism tend

8. to rest their argument on *preference*————.

9. They are most likely to *reject* the preferences ——— and ———.

10. They are most likely to *reject* the *factual assumptions* ———— and————.

V. Fascists are most likely to

11. accept *preference*————.

12. and to follow the policies implied in *factual assumption* ———.

POLITICAL SCIENCE

OBJECTIVES

1. The student will acquire knowledge of fundamental political concepts and institutions and the changing role of the state.
2. The student will develop the ability to relate political science to the other social sciences.
3. The student will develop the ability to observe and evaluate current developments in politics at the national and international level.
4. The student will develop an appreciation of the contributions of the individual and state to social progress.
5. The student will develop the ability to critically assess traditional beliefs, institutions and behaviour patterns in relation to the functions of the state.
6. The student will develop the ability to discuss controversial problems in a dispassionate way and to formulate judgments.
7. The student will develop the ability to apply knowledge of political science to solve current problems in politics and administration.

OBJECTIVE

THE STUDENT WILL ACQUIRE KNOWLEDGE OF AND THE CHANGING

BEHAVIOUR

The student can:

1. recognize reliable sources of information.
2. remember useful political information.
3. distinguish between new and old meanings attached to particular concepts, ideas and principles.

ESSAY FORM

Estimate the implications to the Congress Party and the Communist Party in India of the advent of the Communist Party to power in Kerala.

Open Book Type

(1) With the help of Books, trace the evolution of the concept of Human Rights.

(2) Outline with the help of Books, the variations in the interpretation of Communist Theory from Marx to Khrushchev.

I RECOGNITION FORM

FUNDAMENTAL POLITICAL CONCEPTS AND INSTITUTIONS ROLE OF THE STATE

4. recognize particular illustrations and violations of major ideas, theories, etc.

5. explain political situations in historical perspective.

RECOGNITION FORM

If you have to determine the attitude of the U.S. Government to the question of the recognition of the Communist Government in China, on which of the following sources of information would you rely?

(a) The statements of President Eisenhower
(b) The statements of Democratic Senators
(c) The statements of Republican Senators
(d) The Book on Peace and War by Dulles
(e) The Opinions of University Teachers of International Relations in the U.S.
(f) The Editorial comments of popular Newspapers
(g) The statements of the allies of the U.S. in NATO.

Multiple Choice Type

Select the correct answer

(1) The President of the U.S.A. is:	1. John Foster Dulles 2. Sherman Adams 3. Eisenhower
(2) The Prime Minister of France is:	1. Bidault 2. Mendes France 3. Guy Mollet 4. Gen. De Gaulle
(3) The Party in Power in Burma is:	1. The A.F.P.F.L. 2. The Socialist Party 3. Red Revolutionary Party

Objective 1

Match the names of the authors with the names of their Books

	Authors			*Books*
1.	Rousseau	..	..	Arthasastra
2.	John Stuart Mill	..	..	Oceana
3.	Harrington	..	..	Utopia
4.	Thomas Moore	..	..	On Liberty
5.	Kautilya	..	..	Emile

What among the following arguments are relevant and what irrelevant in regard to the introduction of Second Chambers in our State Legislatures?

(a) They are expensive.

(b) They delay legislation.

(c) The second chambers in England and France have been ineffective.

(d) They lead to legislative deadlocks.

(e) Members of the second chambers are generally too old to be useful.

Who said the following?

(1) "Give me Liberty or give me Death."

(2) "He who knew not how to dissimulate knew not how to reign."

(3) "The question with me is not whether you have a right to render your people miserable but whether it is not in your interest to see them happy."

(4) "England has neither permanent allies nor permanent enemies. She has only permanent interests."

State which of the following political values are illustrated or violated by the introduction of prohibition of alcoholic drinks:

(1) Individual freedom.

(2) The Public Interest.

(3) The element of consent in Social Legislation.

DIRECTIONS: In evaluating the relative merits of various alternative social systems, one may judge each system by its efficiency in achieving the special objectives which that system sets for itself. In the following items

(Continued) RECOGNITION FORM

you are to judge first, what criteria, in terms of which efficiency might be judged, would be considered *legitimate* and *relevant to contemporary* conditions by the supporters of each system; second, to compare these systems with respect to the means each regards as appropriate for reaching its goals.

Note: The phrases "relevant to contemporary conditions" and "at the present time" are intended to mean relevant to post-war socialism in England and contemporary communism in the Soviet Union, but to the 19th century in the case of the liberal system referred to and to pre-war Germany in the case of fascism.

I. Criteria for Evaluating Social Systems

Blacken the answer space corresponding to the letter of the *one best* (accurate and inclusive) *answer* or *completion.*

1. If the definition of what constitutes the "greatest good" were left to each system, which of the following would assert that the system was directed toward "the greatest good for the greatest number"? Defenders of

   A— the 19th-century liberal system.

   B— the socialist system in post-war England.

   C— communism as currently practiced in the Soviet Union.

   D— all of these systems.

   E— none of these systems.

2. Defenders of fascism as practiced in pre-war Germany would regard this criterion (item 1) as

   A— legitimate and relevant to current conditions.

   B— legitimate, but not relevant to current conditions of achieving national security.

   C— illegitimate, since the leaders do not want the greatest good for anybody, irrespective of the latitude given to a definition of "good".

   D— illegitimate, since not only is the number and type of people whose "happiness" is to be maximized seriously restricted, but also because the social organism is regarded as superior to and

Objective 1

inevitably conflicting with the interests of individuals and sub-groups.

E— illegitimate because impossible of attainment.

3. Which of the following have, by their policies, indicated concern for implementing the goal of "maximum security of the person" both as applied to immediate objectives and as a long-term policy?

A— Defenders of the post-war socialist system in England.

B— Defenders of communism as currently practiced in the Soviet Union.

C— Defenders of fascism as practiced in pre-war Germany.

D— Defenders of all of these systems.

E— Defenders of none of these systems.

II. Definition of Critical Terms

DIRECTIONS: The four systems to be compared here are 19th-century liberalism, socialism as practiced in post-war England, communism as currently practiced in the Soviet Union, and fascism as practiced in pre-war Germany. For each item, *blacken* the answer space corresponding to the letter of the *one best* answer.

1. With respect to the definition of "good" in the criterion "the greatest good for the greatest number" (item 1 above), which of the systems would have most in common?

A— The 19th-century liberal system and socialism as practiced in post-war England.

B— Socialism as practiced in post-war England and communism as currently practiced in the Soviet Union.

C— Communism as currently practiced in the Soviet Union and fascism as practiced in pre-war Germany.

D— Socialism as practiced in post-war England and fascism as practiced in pre-war Germany.

2. With respect to the definition of "desirable individual self-development", which of the following systems would currently have most in common?

(*Continued*) RECOGNITION FORM

A— The 19th-century liberal system and socialism as practiced in post-war England.

B— Socialism as practiced in post-war England and communism as currently practiced in the Soviet Union.

C— Communism as currently practiced in the Soviet Union and fascism as practiced in pre-war Germany.

D— Fascism as practiced in pre-war Germany and socialism as practiced in post-war England.

3. With respect to the definition of membership in the society, which system establishes permanent and inescapable barriers to certain groups or individuals to the achievement of full and active membership?

A— The 19th-century liberal system.

B— Fascism as practiced in pre-war Germany.

C— Socialism as practiced in post-war England.

D— Communism as currently practiced in the Soviet Union.

E— Each system makes so many (or so few) exceptions that they cannot be compared.

III. Means Appropriate to Implementation of Goals

DIRECTIONS: In the following items you are to judge the similarities and differences among the several systems with respect to the means regarded as appropriate for reaching the various goals. *Blacken* the answer space corresponding to the letter of the *one best* answer or completion.

4. The *greatest agreement* with respect to the legitimacy of manipulating people in order to achieve relevant objectives exists between

A— the 19th-century liberal system and socialism as practiced in post-war England.

B— socialism as practiced in post-war England and communism as currently practiced in the Soviet Union.

C— communism as currently practiced in the Soviet Union and fascism as practiced in pre-war Germany.

D— the 19th-century liberal system and communism as currently practiced in the Soviet Union.

Objective 1

(*Continued*) RECOGNITION FORM

E— Two of the above pairs cannot be distinguished, since one pair agrees in accepting manipulation and another pair agrees in rejecting it.

5. With respect to the legitimacy of the use of fear as a technique of social control, the *greatest agreement* exists between

A— the 19th-century liberal system and socialism as practiced in post-war England.

B— socialism as practiced in post-war England and communism as currently practiced in the Soviet Union.

C— communism as currently practiced in the Soviet Union and fascism as practiced in pre-war Germany.

D— the 19th-century liberal system and communism as currently practiced in the Soviet Union.

E— Two of the above pairs cannot be distinguished, since one pair agrees that it is legitimate and another pair agrees that it is illegitimate.

6. Social stratification (i.e., wide differences in status, income, or power) may be regarded as an obstacle to social goals or alternatively as a technique useful in implementing them. In which system would the social stratification existing under the system be regarded as the greatest obstacle to immediately pursued social goals?

A— The 19th-century liberal system.

B— Fascism as practiced in pre-war Germany.

C— Communism as currently practiced in the Soviet Union.

D— Socialism as practiced in post-war England.

E— All of the above.

OBJECTIVE

THE STUDENT WILL DEVELOP THE ABILITY TO OBSERVE AT THE NATIONAL AND

BEHAVIOUR

The student can :

1. read and interpret statistical, economic and other data and infer major trends and developments.

ESSAY FORM

Year of Election

I.	1951	1956	1961	
No. of voters	75,848	55,739	68,673	
Votes cast	25,342	15,378	38,573	(Congress
Congress	10,458	6,482	13,389	Candidates
Socialist	8,531	982	9,578	Elected)
Communist	4,434	1,343	2,344	
Independent	1,854	2,444	12,547	

From the above data of votes polled in the last three general elections in three constituencies point out the defects in our present electoral system.

II.

From the election results given in Question No. I, how correct would it be to say that India is not heading toward a two-party system?

III.

How do you account for the increasing number of votes that the Independents have been securing during the last three general elections ?

IV.

Do you think that India is justified in giving the right of vote to women ? Illustrate your answer from the use that was made of this right by women as voters and candidates. (Students can refer to books).

V.

How far do you think that the experience that India has gained in parliamentary government since 1919 will be useful in making Parliamentary System a success in India ?

3 RECOGNITION FORM

AND EVALUATE CURRENT DEVELOPMENTS IN POLITICS INTERNATIONAL LEVEL

2. recognise authoritative and non-authoritative sources of information.
3. collect information on his own.
4. relate current developments to prior developments.

RECOGNITION FORM

Statement :

"Equal educational opportunity for all persons, to the maximum of their individual abilities without regard to economic status, race, creed, colour, sex, national origin, or ancestry is a major goal of American democracy. Only an informed, thoughtful, tolerant people can maintain and develop a free society.

"Equal opportunity for education does not mean equal or identical education for all individuals. It means, rather, that education at all levels should be equally available to every qualified person."

— President's Commission on Higher Education, December, 1947

1. Which one of the following objectives implied or expressed in the Statement is assumed to be of fundamental importance, to which all the others contribute ? (one answer)

   A— An informed, thoughtful, tolerant people.

   B— Equal educational opportunity.

   C— A free society.

   D— American democracy, because it is the best social system in existence.

   E— Distribution of pleasures to those who can best enjoy them.

2. The Statement asserts or implies that (one answer)

   A— the available opportunities for education should be distributed on the basis of personal ability and desire only.

Objective 3

VI.
Examine the factors that have tended to increase governmental control over social and economic activities in recent times.

VII.
With special reference to the nationalization of insurance, what do you think are the problems that will arise out of governmental control in economic activities?

VIII.
Enumerate some of the fundamental rights and basic duties of a citizen and show how they are correlated.

(*Continued*) RECOGNITION FORM

B— a larger total quantity of education should be made available than is the case at present.

C— both A and B.

D— the quality of American teachers should be improved.

E— the amount of education which all Americans have in common should be increased.

3. Educational opportunities up to the maximum of individual ability are now available to (one answer)

A— no one in the United States.

B— a smaller proportion of Americans than before, as a result of increasing stratification.

C— those who can pay for it and who do not belong to unpopular "minority groups", and to a few others.

D— almost everyone, because of the extensive system of public education and scholarships.

4. The greatest obstacle to the attainment of the educational objectives outlined in the Statement is (one answer)

A— the differing native abilities of individuals.

B— the distribution of family incomes.

C— sex discrimination.

D— the poor quality of American educational institutions.

E— monopsony in the "market" for education.

5. Which *two* of the following statements, taken together, support the view that the educational reforms listed in the Statement *would* support a free society?

A— When all citizens share the same educational experience, they are likely to agree on important issues.

B— Diminishing vertical social mobility is a major source of dissensus in American society.

C— Eternal vigilance is the price of liberty.

D— The existing class structure corresponds, by and large, to the distribution of developed abilities in the population.

Objective 3

(Continued) RECOGNITION FORM

E— These educational reforms would make it possible for significantly more people to achieve positions of higher income, prestige, and responsibility.

6. Which *two* of the following statements, taken together, imply that the specific educational reforms advocated in the Statement *would not* contribute to the objectives assumed (in the Statement) as prerequisites for a free society?

A— Education promotes fuller self-realization.
B— Education is essentially a process of exploration.
C— The true interests of different individuals necessarily and fundamentally conflict.
D— Toleration sometimes means mere indifference.
E— The education of young children is necessarily somewhat authoritarian.

7. Which *two* of the following statements, taken together, imply that the specific educational reforms advocated in the Statement *would not* contribute to the objectives assumed as prerequisites for a free society?

A— Highly specialized education produces a "trained incapacity" to deal with certain types of problems.
B— Education promotes devotion to free and full discussion.
C— Most contemporary social problems require the services of specialists at some phase in their solution.
D— Discussion about moral problems usually leads to a sharpening of disagreement, not to agreement.
E— In a democracy, everyone participates in the formation of public opinion.

OBJECTIVE

THE STUDENT WILL DEVELOP THE ABILITY TO DISCUSS AND TO FORMULATE

BEHAVIOUR

The student can:

1. comprehend the ideas and correctly interpret the facts.
2. recognize the essential elements of the problem.
3. accurately state the different points of view involved.

ESSAY FORM

Read the following extract carefully and answer the following questions:—

"While some Western diplomats, says P.T.I., initiated a new move in an effort to find a solution to the Lebanese crisis with the Government itself appearing undecided on its next step—whether or not to call for a Security Council meeting—rebel commanders broke into the main Secretariat Buildings and other Government Centres firing indiscriminately".

"Western diplomats have been attempting to contact some important rebel leaders in an effort to effect a compromise between the rebels and the Government".

"The opposition has been demanding the immediate resignation of President Chamoun".

"Intermediaries are said to be at work to select a compromise candidate. Fighting here yesterday prevented a meeting arranged with some rebel leaders".

"The U.N. Observation Group's first report, which virtually cleared the U.A.R. of the charges of massive intervention in Lebanese affairs, is considered as a diplomatic defeat for the Government and has angered it".

"The Prime Minister said that this has not affected the legality of the Lebanese complaint to the Security Council".

(Extracts from the Sunday Statesman; July 6, 1958.)

1. a) Why is the Governmtnt of the Lebanon undecided on whether or not to call for Security Council meeting?

6 RECOGNITION FORM

CONTROVERSIAL PROBLEMS IN A DISPASSIONATE WAY JUDGMENTS

4. critically appraise the pros and cons of the question.
5. judge and select the most workable or satisfactory solution under the circumstances.

RECOGNITION FORM

1. The Government of the Lebanon is undecided in whether or not to call for a Security Council meeting, *because* .....
   (Choose the correct answer, if any, from the statement given below)
   a) The Western Powers are mediating between the rival parties.
   b) The United Nations Report says that the U.A.R. has not interfered in the struggle.
   c) The Lebanese Government is not doubtful of the legality of its complaint to the Security Council.
   d) Fighting is going on in the Lebanon.

2. Arrange in the order of importance the correct reasons, from those given below, for the non-occurrence of a meeting between the Government and the rebel leaders.
   a) The Western diplomats are negotiating for a meeting.
   b) The rebels are asking for the resignation of President Chamoun.
   c) Government intends appealing to the Security Council.
   d) Fighting is going on in the Lebanon.
   e) The U.N. group has denied the contention of intervention by the U.A.R. in the Lebanon.

DIRECTIONS: Read the following Statement and answer items 1 to 5 Which are based on it. For each item *blacken* the answer space corresponding to the letter of the *one best* answer or completion.

STATEMENT: (i) "There is no equivocation in the public philosophy about the principle of the defense of free institutions. The rule is that the right to enjoy them and the duty to maintain them are inseparable. The right to these institutions is, that is to say, for those who adhere to them.

Objective 6

b) What is the demand of the Opposition to ease the Crisis?

2. In view of the Report of the United Nations Observation Group that the U.A.R. is not behind the uprising in the Lebanon, how is it possible for the Lebanese Government, to invoke the intervention of the Security Council?

3. a) If the Security Council does not interfere, what are the possibilities of the Western Powers coming to the rescue of the Government?

   b) Why is it that in a democracy a resort to force is not considered proper for removing political opponents from power?

4. What steps, in your view, should be taken by President Chamoun to solve the crisis without further bloodshed?

5. Discuss how far the West will be justified if they send forces to prop up the Government of Chamoun.

(*Continued*) RECOGNITION FORM

(ii) "The criterion of loyalty is an indubitable commitment to defend and preserve the order of political and civil rights. The question of whether the liberal democratic states should outlaw, or in other ways contain, counter-revolutionary movements is not one of principle but of expediency and practical prudence. There is no doubt about the principle: that the counter-revolutionary movements are enemies of the state, and must be defeated.

(iii) "In applying the principle the specific question of whether this party or that individual is or is not loyal is a matter to be determined by due process. For while there can be no right to destroy the liberal democratic state, there is an inalienable right to have the question adjudicated justly in all particular cases as to whether this person or that is an enemy of the state. The right cannot be denied to those who have not been proved guilty without denying it to all who would be proved not guilty.

(iv) "The limits of dissent are not too difficult to fix when we are dealing with avowedly revolutionary parties like the communists and fascists. The borderline between sedition and radical reform is between the denial and the acceptance of the sovereign principle of the public philosophy: that we live in a rational order in which by sincere inquiry and rational debate we can distinguish the true and the false, the right and the wrong."

— Lippmann. *The Public Philosophy.*

1. When Lippmann speaks in paragraph (i) about "free institutions" he is talking, as is made clear in the later paragraphs, about
   A— freedom of speech, press and assembly.
   B— freedom of economic enterprise.
   C— freedom of educational institutions from governmental interference.
   D— all of the above.
   E— A and B above, but not C.

2. Lippmann's argument that certain movements can, in principle, be outlawed rests upon the thesis that
   A— associations are not protected by the Bill of Rights.
   B— it always is expedient to promote security.

Objective 6

(*Continued*) RECOGNITION FORM

C— certain movements are guilty on their face.
D— the state always has the right to fight its enemies.

3. Lippmann's view of a citizen's rights is best expressed in the assertion that:

A— All rights are subordinate to duties.
B— There is a natural right of revolution, but not of counter-revolution.
C— There is an inalienable right to justice, at least in the procedural sense.
D— Only the just have an inalienable right to just procedures.

4. The rights of communists and fascists to enjoy free institutions are, according to Lippmann:

A— to be maintained against all abridgment.
B— to be assured insofar as they are limited to honest dissent.
C— to be denied.
D— to be denied except where, in a fair trial, the accused can show themselves to be rational.

5. Lippman's view of the proper treatment to be accorded individuals and/or associations appears to be that:

A— Men, who individually deserve the protection of the law, should be denied the right to form associations which undermine the existence of law in general.
B— Associations cannot be different in quality from the men who compose them and should be treated as individuals are treated.
C— There are good citizens who deserve the laws protection and radical men who do not.
D— There are rational men who should be free, and there are irrational men who should not be free.

OBJECTIVE

THE STUDENT WILL DEVELOP THE ABILITY TO APPLY PROBLEMS IN POLITICS

BEHAVIOUR

The student can :

1. identify the conditions under which different principles and theories in Political Science work successfully in different times and places.
2. determine or predict, with the help of statistical tools, the consequences of each principle and theory in a given situation.
3. analyse and identify the data of a new problem.

ESSAY FORM

1. One of the fundamentals of our system of government is that some minister is responsible to Parliament, and through Parliament to the public, for every act of the executive (Herbert Morrison's "Government and Parliament"). Do you think that this principle was followed when Mr. Krishnamachari resigned over the question of the purchase of life insurance shares authorized by the civil servants on his behalf?
2. In the United Nations, Soviet Union and U.S.A. took opposite views on problems of human right. The Soviet Union pressed for more concrete provision in matters like right to employment, social security, racial equality, etc., while opposing some of the U.S. proposals in regard to freedom of the press, freedom of speech, etc. On the other hand, the U.S. opposed some of the Soviet proposals regarding economic and social equality. Account for this conflict of views with reference to the various theories of rights.
3. The British Prime Minister is always the leader of the majority party. The French Prime Minister never is. Why are not the same rules of Cabinet government followed in Britain and France?
4. Estimate the influence of the principle of separation of powers developed by Montesquieu on the draft of the French Constitution prepared by De Gaulle.
5. Do you think that the return of the Kerala Education Bill by the President is in consonance with the principles of federalism?

7 RECOGNITION FORM

KNOWLEDGE OF POLITICAL SCIENCE TO SOLVE CURRENT AND ADMINISTRATION

4. identify principles and ideas which a new problem demands if desirable consequences are to be achieved.
5. communicate effectively, the means which he has determined as necessary for a new situation.
6. identify himself with current political problems in such a way that he is an active though impartial participant in the process.

RECOGNITION FORM

DIRECTIONS: In each of the following items a certain social or economic condition or policy is described and a certain group or groups mentioned. You are to judge the effect of this condition or policy on consensus *within* the group, if only one group is mentioned; or on consensus *between* the two groups, if two groups are mentioned. *Blacken* answer space

A— if the policy or condition is likely to result in *increased* consensus.
B— if the policy or condition is likely to result in *decreased* consensus.
C— if the policy or condition is likely to have no effect or an indeterminate effect on the level of consensus.

	Condition or Policy	*Group or Groups Involved*
1.	Decentralization of urban centres	Farmers and urban dwellers
2.	Teaching of morality, based on individual self-interest	Student body of a university
3.	Voluntary sharing of responsibility for factory administration	Shop foremen and shop stewards
4.	More stringent divorce laws	Newly married couples
5.	Administration of local school system by combined boards of educational specialists and representatives from various civic and labour groups	School teachers and parents of community

Objective 7

6. The goal of the Indian National Congress is defined as the attainment of socialism. How is this goal different from that envisaged by Marx, Lenin, Stalin and Khrushchev?

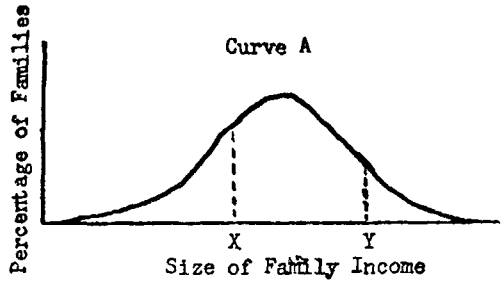
7. "Rights are those conditions of social life without which no man can be himself at his best". (Laski) Make a critical estimate of Fundamental Rights guaranteed by the Indian Constitution in the light of this statement.

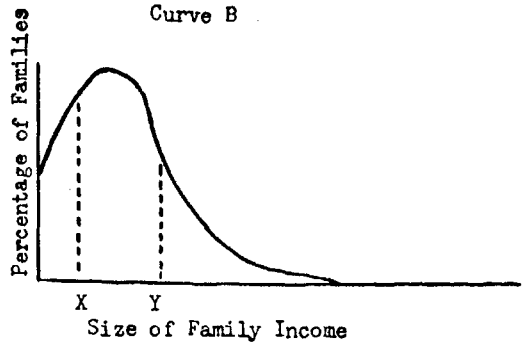
(*Continued*) RECOGNITION FORM

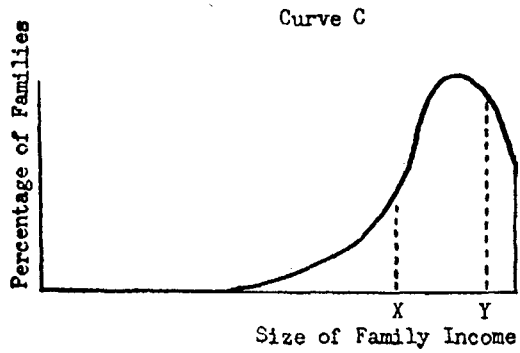
6.	Introduction of a sales tax on food	Upper middle class and working class
7.	Increased government subsidy for private family home ownership	Urban dwellers
8.	Effective all-round anti-business cycle programme on the part of U.S. government and U.S. business	Workers and employers
9.	Gratification of demand of lower as well as higher classes for moderate amounts of deference	Total society
10.	Introduction of regressive income taxes	Upper and lower classes
11.	Wide discrepancy between commonly accepted goals of social success and the distribution of opportunities to achieve social success	Lower class
12.	Intentional elimination by management of up-grading of workers into supervisory positions and the deliberate adoption of a policy of using college trained personnel	Employers and employees
13.	Ethnic heterogeneity	Total society
14.	Family system in which the social distance between parents and children is great	First and second generation immigrants
15.	Residence in hotels and in rooming houses	Urban community

DIRECTIONS: Below three graphs are given, representing three different possible distributions of family income. The questions are based on an interpretation of these graphs and refer to the United States. For each item *blacken* the answer space corresponding to the letter of the *one best* answer or completion.

Objective 7


Curve A
Percentage of Families
X
Y
Size of Family Income


Curve B
Percentage of Families
X
Y
Size of Family Income


Curve C
Percentage of Families
X
Y
Size of Family Income

(Continued) RECOGNITION FORM

1. Which of the above graphs most closely resembles the present distribution of family income in the United States?
   A– Curve A
   B– Curve B
   C– Curve C
   D– It is impossible to tell from the graphs.

2. Which of the following policies would be most conducive to reducing the numbers of families whose income is less than X?
   A– Family subsidies in the form of money payments–the size of the subsidy being inversely proportional to the size of family income.
   B– Encouragement of strong labour unions among skilled workers.
   C– Introduction of a highly progressive income tax with no change in the incidence of government expenditures or of other taxes.
   D– None of the above policies.

3. Which of the following policies would be most conducive to reducing the number of families whose income is greater than Y?
   A– Consumer subsidies in the form of money payments
   B– Encouragement of strong labour unions among skilled workers.
   C– Increasing the progressiveness of income and estate taxes.
   D– None of the above policies would significantly affect the number of families in that income group.

4. As further implementation of income-equalizing policies, total family income could be limited to $ 25,000. One major limitation of such a plan is that it might reduce total national income.
   A– through its effect on the allocation or employment of unskilled labour.
   B– through its effect in encouraging a significant proportion of the population to remain idle.
   C– through its effect on the allocation of very scarce talent or managerial skill, and on the investment of private savings.
   D– through its effect on monopoly of talent.
   E– but not via any of the effects listed above.

PSYCHOLOGY

OBJECTIVES

1. The student should acquire knowledge of facts, basic concepts and theories.
2. The student should develop the ability to apply the facts, concepts and theories to actual life situations.
3. The student should be able to tackle simple problem cases.
4. The student should develop interest in human affairs and human behaviours.
5. The student should know the limitation of the applications of psychology.
6. The student should develop a skill for minute observation of details of behaviour and accurate report thereof.
7. The student should understand the significance of individual differences in all interpersonal situations.
8. The student should be able to locate problems of psychological nature.
9. The student should be able to carry on simple experiments in actual life problems.
10. The student should develop the ability to draw conclusions from data and to suggest methods of investigating the problem further.
11. The student should develop the ability to make a total dynamic approach in understanding behaviour.
12. The student should be able to transfer the knowledge and understanding gained in one field to another field.
13. The student should be able to correlate theoretical study with laboratory and field experiences.
14. The student should develop skill in the use of psychological and statistical techniques.
15. The student should be able to comprehend technical literature on psychology.

OBJECTIVE

THE STUDENT SHOULD ACQUIRE KNOWLEDGE

BEHAVIOUR

1. The student is able to differentiate between relevant concepts in a given new situation.
2. The student can give new illustrations and examples relating to major terms and facts.
3. The student knows the scope and limitations of important principles.

ESSAY FORM

No essay questions were prepared for this objective.

1 RECOGNITION FORM

OF FACTS, BASIC CONCEPTS AND THEORIES

4. The student knows the major problems of psychology.
5. The student is able to establish fundamental relationships between facts and theories.
6. The student is able to predict reactions in a particular situation.
7. The student is able to classify and arrange facts.

RECOGNITION FORM

"His only son had left the family. His eyes suddenly glistened with tears[1]. He took a deep breath—His face turned pale and his[2] limbs stiff—–where could[3] his son go ?—The money he had given[4] him a week back[5] he thought—might serve his needs for[6] only a few days. After that ! He visualised his only son[7] begging in the street. He shuddered at the idea[8]—and a gloom of[9] despair overtook his thoughts—He[10] was realising what great weakness[11] he had for his son—which he had never[12] recognised before—How much he longed to see[13] his son at that moment—He wished he had wings to[15] fly and explore the earth's surface to find his son—The door banged[16] violently.

He turned his ears—and looked at the door[17]—His son was entering the room[18]—there[19] was a glow—on his face which turned a pallor[20]—as he realised[21] that it[22] was a gust of the stray easterly breeze—What[23] could he do about the calamity ? His mind started working[24]—He was[25] reminded of his friend—who was an influential member of the State legislature[26]—He could approach[27] the State Q police with the help of his friend[28]—Or he would approach the local news agency to flash in all newspapers—an award of Rs. 1,500/- to[29] the person who would get his son back to him—But[30] if he refuses to come back—A spell of despair again[31] overtook him. People will know that his[32] son had left the family. The news would[33] spread from mouth—each person adding his own[34] reading of the case—They will all think that he has[35] been careless about his only son—He did not give him[36] all the love and affection needed. His enemies will[37] add more colour to it—Everybody would come to enquire[38] about it—Look down upon him[39]. It will be all so horried—How will he be able to face it. He too[40] will leave his home[41] and go to Chicago—and go to reside in a new city[42]—where

Objective 1

everybody will be a stranger[43]—He will adopt their ways[44] ways, manners and customs and lead a new life[45].

The above passage has been broken up into 45 parts. Each part is numbered 1-45.

PSYCHOLOGICAL TERMS, choose the one that is most appropriate to a part of the above passage. Write the number for that part against the related term. You may have to choose the same term for more than one part and thus write more than one number against a term.

a) Sensation
b) Perception
c) Attention
d) Imagery
e) Illusion
f) Hallucination
g) Thinking
h) Feeling and Emotion
i) Need and Motive
j) Learning
k) Attitude
l) Opinion
m) Rumour
n) Propaganda.

DIRECTION : For the items below (1-3) *blacken* answer space according to the *one best* answer.

1. Descriptions of the conditions of several patients undergoing treatment for hysteria are described below. Which patient would Freud consider closest to being cured ?

   A— The analyst has discovered that this patient has repressed his hostility toward his father.

   B— The analyst told this patient, "You suffer from guilt because you hate your father". The patient replied : "Yes".

   C— Through analytical treatment this patient discovered that he had been repressing his hatred toward his father. He reacted to this discovery with great emotion, releasing much of the aggression which he had heretofore repressed.

(Continued) RECOGNITION FORM

D— This patient told the analyst, "Yes, I suppose I hate, my father", He did not, however, feel any emotion at this discovery. Soon thereafter the patient began to hate his analyst, although he did not understand why.

2. A patient undergoing psycho-analysis had a dream in which he saw himself picking flowers. Below are given his free associations to this dream. Which of these associations would Freud consider important in interpreting the dream ?

A— Beautiful smell

B— Mother

C— Grass

D— Pink

E— Freud would consider all of the associations important in interpreting the dream.

3. Freud states that all dreams are wish fulfilments. A student dreamed that he flunked all of his examinations. He felt very unhappy about this. Which of the following items best reconciles this dream with Freud's 'theory of dreams'.

A— This student wanted to flunk his examinations.

B— This student, perhaps unconsciously, was angry with himself and wished to punish himself. His super-ego accomplished this through the dream.

C— Freud explains this type of dream by pointing out that dreams may not be wish fulfilments if a person's aggression against himself is sufficiently strong.

D— This dream indicates that the person is what Freud would call a schizophobe hysteric; that is, a neurotic person whose dreams always appear as the opposite of what he really wishes.

DIRECTIONS : For the following items, *blacken* the answer space corresponding to the letter of the *one best* answer.
Hypothetical case : "Josephine wanted very much to gain the affection and admiration of her father who was a harsh and dictatorial person. Her father, however, did not particularly care for Josephine because he wanted a son".

Objective 1

1. Several hypothetical developments for Josephine are described below. Which one most closely resembles the "overdetermined identification" employed by Peter, the little boy described by Erikson whose nurse left him and who then acted as if he thought he was pregnant.

   A— Josephine, realizing that her father did not love her, forgot about him and turned all of her affection on her mother.

   B— Josephine threw away her dolls and took to playing marbles and baseball. She also became very domineering and refused to play with other children unless she could be boss.

   C— Josephine became very meek, submissive, and "feminine" in an attempt to win the affection of her dictatorial father.

2. Such "overdetermination", if considered in terms of Freudian theory, is most analogous to which of the following?

   A— A child normally develops traits possessed by both its father and mother.

   B— A young man in love had a dream in which an old lady, a flower, and a house all symbolized the woman he loved.

   C— A young man wished to pass his examinations. He therefore studied every day until four in the morning.

   D— A man, who had been in an automobile accident, had a repetitive dream in which he was always killed.

3. Which of the following items exemplifies what Erikson calls "identification"?

   A— A girl of five lost her mother whom she loved deeply. The mother had been a very cleanly person. After the mother's death, the child became pathologically cleanly.

   B— A little boy, as an infant, loved his mother but hated his father. A few years later, he still loved his mother but he tried as hard as he could to be like his father.

   C— A girl of three loved her mother deeply. When, however, she saw how much her mother loved her father, the little girl tried to be as much like her mother as she could.

   D— All three of the above exemplify identification.

   E— Only items A and B exemplify identification.

(Continued) RECOGNITION FORM

4. According to Erikson, a child who builds block houses and then kicks them down is primarily

   A— expressing his destructive instinct.

   B— symbolically knocking down some one whom he hates.

   C— enjoying the fact that he, who so recently had trouble learning to keep upright, can now watch something else take a tumble.

   D— preparing himself for later life, by acting out the fact that nothing in life is permanent.

OBJECTIVE

THE STUDENT SHOULD DEVELOP THE ABILITY TO ACTUAL

BEHAVIOUR

1. The student should be able to find out what facts and principles are relevant to a particular given situation.
2. The student should be able to analyse a given problem objectively even though it may involve emotional factors.
3. The student is able to distinguish the psychological factors involved in a situation from the non-psychological ones.

ESSAY FORM

The following are the ratings of an individual.

Clinical rating :

Badly organised personality, dependent abnormal before illness, narrow interests, little energy, dyspepsia, abnormality in parents, poor muscular tone, unsatisfactory home, hypochondriasis, no group membership.

Self Assessments :

Inferiority feelings, touchy, nervous, autonomic symptoms, disgruntled, accident-prone, intolerant.

Constitution :

Physique–Leptomorph, Effort responses : Poor, Dark Vision : Poor, Static Equilibrium : Poor.

Intellectual Functions :

Low intelligence.

Low retest reliability.

Test Response:

High suggestibility.

Little persistence.

2 RECOGNITION FORM

TO APPLY THE FACTS, CONCEPTS AND THEORIES LIFE SITUATIONS

4. The student is able to predict what is likely to happen under a specified set of conditions.
5. The student is able to suggest courses of action which will enable one to meet the situation effectively.
6. The student is able to understand his personal problems of adjustment, and work out a solution.

RECOGNITION FORM

DIRECTIONS: Freud discusses a great number of ways or methods by which human beings strive to gain happiness and avoid pain. For the items below *blacken* answer space.

A— if the item names or describes a person who tries to find happiness in unbridled gratification of his desires;

B— if the item names or describes a person who would tend to seek voluntary isolation as the readiest safeguard against the unhappiness that may arise out of human relations;

C— if the item names or describes a person seeking happiness in sublimation;

D— if the item names or describes an example of sublimation in which a person is seeking happiness in combining with the rest of the human community in taking up the attack on nature, thus forcing nature to obey human will under the guidance of science.

Note: When both "C" and "D" above are applicable give only "D" as the one best answer.

1. A young man named Jones never goes out with girls. Instead he takes long walks by himself. Jones was an unwanted child, and as an infant, never received affection from his parents.
2. Converts to Calvinism were unable to endure the harsh doctrine of predestination. In time, they came to believe that their success in

Objective 2

Slow personal tempo, low fluency.

Extreme perseveration (high or slow).

Uneven curve of practice (Learning).

Little improvement during practice.

Abnormal ranking Rorschach responses. High colour/form ratio.

Abnormal lack of sociability.

Tendency to repression

(b) Underline those traits which are due to hereditary influences and tick those which are due to environment.

(c) Encircle those where it is not possible to disentangle the influences of nature and nature.

(d) Is the individual a Schitzophrenic, Paranoid, Manic-depressive, highly neurotic or none of these?

(e) Which of the following can best explain the data and how?

(i) Freud's concept of the failure of the ego.

(ii) Pavlev's "Weakness of nervous functioning"

(iii) Watson's "faulty conditioning"

(iv) McDougall's failure to achieve integration through the self regarding sentiment".

(*Continued*) RECOGNITION FORM

their calling was a sign that they were among those chosen to be saved.

3. A Zuni Indian, who spends much time producing beautiful pottery.
4. A very young infant.
5. A child who refuses to play with the other children or to have anything to do with the counsellors.
6. The Zuni Indian who could find no outlet for his unusual energies and ambitions. Thereupon, he became an expert in the long and involved ritual chants of his people.
7. A hermit.
8. A boy who loved atheletic activities became crippled. He thereupon devoted himself to mathematics.
9. A bacteriologist at work on a research project which will improve the yield of wheat.

Situation

An adolescent, twelve to thirteen years of age, thinks of running away from home and tells you about it.

List of consequences

For items 1-10, *blacken* answer space

A if the consequence of a course of action will most likely be that he will run away.

B if the consequence of a course of action will most likely be that his desire to run away will increase.

C if the consequence of a course of action will most likely be that no change will occur.

D if the consequence of a course of action will most likely be that he will develop fear or anxiety.

E if the consequence of a course of action will most likely be that he will, due to this course of action, lose the desire to run away.

Objective 2

Courses of Action and their Consequences

1. He should be encouraged to try to run away.
2. He should be told that he will be unhappy if he runs away.
3. One should explain to him that he will be unable to take care of himself, that if he runs away he will become destitute.
4. One should describe to him what his life will be like if he runs away; that he will have to sleep in alleys, to beg or even to steal his food.
5. He should be told about his obligation to his parents, how much he owes to them.
6. He should be told that his ideas are foolish, that he does not know what he is thinking about, that he is too young for such ideas.
7. One should do nothing since such fantasies are fairly typical for this age.
8. One should give him adventure stories to read so that he may satisfy his imagination.
9. He should be prevented from reading adventure or similar stories, from seeing exciting movies, etc., so that his fantasies will not be fed.
10. He should be supervised more strictly, be forced to occupy himself most or all of the time so that he won't have time for such ideas.

DIRECTIONS: Below you are given a group of statements about the culture of the Japanese. These statements are followed by comments which describe certain personality or behaviour traits of the Japanese and questions about each comment. Read the statements as if they were a paragraph description of the Japanese. Then answer the questions following each comment.

STATEMENTS:

A— Japanese children are teased a great deal by their parents. In fact, the child is disciplined by being made fun of.

B— There is a marked discontinuity in the upbringing of Japanese boys. As infants, all satisfactions are possible to them and they are treated like little gods. But at the age of six or seven increasingly heavy responsibility is placed on them and this responsibility is upheld by the most drastic sanctions.

(*Continued*) RECOGNITION FORM

C— There is very little in Japanese life that permits the harmless diffusion of emotion. There is everything that locks it in, represses it, frustrates it, chokes it.

D— If a boy is disrespectful to his teachers, his family may cast him out. He is made to realize that he is his family's representative before the world.

E— Japanese children are taught that they owe a great indebtedness to their parents.

Consider the above statements in the light of what you have learned regarding the analysis of culture. Unless otherwise directed, *blacken* the answer space corresponding to the letter of the above statement which supplies the *one best answer* to the question following the comments.

COMMENT: In Japan the individual is sure of support from his own group only as long as approval is given by other groups.

1. Which statement above furnishes data for this comment?

COMMENT: The great moral decisions of the Japanese have hinged not on the battle of good and evil of the individual's inner consciousness, but on the opposition between the individual's personal inclinations and his social duty.

2. Which *two* statements above describe a fact of Japanese life which would be likely to produce the phenomenon described in the comment?

COMMENT: In Japan, the approval of the "outside world" takes on an importance probably unparalleled in any other society.

3. Which statement most strikingly exemplifies this comment?

COMMENT: Japanese behaviour is full of contradictions and gives evidence of a deeply implanted dualism.

4. Which statement describes a condition which would be likely to produce the behaviour described in the comment?

COMMENT: Fear of ridicule is one of the strongest social restraints.

5. Which statement describes a fact which would be likely to produce the attitude described in the comment?

Objective 2

(*Continued*) RECOGNITION FORM

COMMENT: On the one hand the Japanese keep to extremes of restraint; on the other they explode in extremes of excess.

6. Which statements (*two* answers) describe facts, etc., which would be most likely to produce the behaviour described in the comment?

Situation

A child of four is in a nursery school. He tries to attract the attention of the teacher and demonstrates a "showing-off" attitude.

List of consequences

Blacken answer space

A if the consequence of a course of action will most likely be that the child will be cured of this behaviour.

B if the consequence of a course of action will most likely be that the situation will improve.

C if the consequence of a course of action will most likely be that no change in behaviour will occur.

D if the consequence of a course of action will most likely be that he will get worse, ask for more attention, etc.

E if the consequence of a course of action will most likely be that he will become aggressive.

Courses of Action and their Consequences

1. The teacher should give him as much attention as she can without endangering her and his standing within the group.
2. The teacher should make the child ludicrous in front of other children.
3. The teacher should ignore the child as long as he continues with his demands for attention and his "showing-off" attitude.
4. The child should be punished whenever he shows this behaviour.
5. The teacher should tell the parents to improve the home-life of the child.
6. The teacher should tell the parents not to permit the child to demonstrate this behaviour (demand for attention, "showing-off") at home.

OBJECTIVE

THE STUDENT SHOULD DEVELOP A SKILL FOR AND ACCURATE

BEHAVIOUR

The student can:

1. observe and report essential facts and their relationships in new situation.
2. recognize the major behaviours which distinguish one person from another.
3. describe an event in such clear terms that others know what occurred.

ESSAY FORM

I. The candidates are to observe a play room through a one way screen. Two 3-year-old children are brought in the play room. The candidates are told their names. After 15 minutes, the candidates are given the following questions (i) Describe the behaviour of the two children in twenty lines. (ii) Which of the following adjectives describe the behaviour of child 1.

   a) Friendly b) Timid and shy c) Self-reliant d) Aggressive e) Constructive f) Calculating g) Talkative h) Considerate i) Stubborn j) Inert k) Intelligent.

II. A film depicting a problem pupil (bully) is shown to a group of five fairly motivated 1st year students and the final year candidates. The observers are asked to report what they have seen. A comparison is made between the two reports in terms of the frequency of psychologically significant activities mentioned by the two types of audience.

Tape recording of a therapeutic interview is played back before the candidates. Each is required to report the salient points and issues that came up in the interview. Statements are framed, some of which relate to the actual content of the interview and others refer to matters not connected with the interview. The candidates are to classify all the statements under the two categories.

6 RECOGNITION FORM

MINUTE OBSERVATION OF DETAILS OF BEHAVIOUR REPORT THEREOF

4. report behaviour overlooked by others or considered to be insignificant.
5. classify aspects of observed behaviour in their appropriate categories.
6. detect gaps in a psychological report.
7. remain unaffected by distracting stimuli and irrelevant happenings.

RECOGNITION FORM

Note : The objective obviously requires the candidate to report his own observations. It is not likely that recognition forms of questions can be used for this objective.

OBJECTIVE

THE STUDENT SHOULD DEVELOP THE ABILITY TO DRAW INVESTIGATING THE

BEHAVIOUR

The student can :

1. draw conclusions from the data provided.
2. detect errors, if any, in the conclusion deduced from the data.

ESSAY FORM

Here are two poems which are learned by two groups of subjects

A. "Families when a child is born
Want it to be intelligent.
I through intelligence
Having wrecked my whole life
Only hope the baby will prove
Ignorant and stupid
Then he may crown a tranquil life,
By becoming a cabinet minister".

B. VOX SOX LOX HOX
TIM TOM SIM SUM
HOR TOR SUT SYT
ZIRK TORK NOST PIST
SIP HIP DIP NIP
QUA LYZ PEZ DIT

Group I : 15 year old students read A and B ten times each.

Group II : 15 year old students read A and B until the first correct repetition. After 2 weeks the reproductions were as follows :

10 RECOGNITION FORM

CONCLUSIONS FROM DATA AND TO SUGGEST METHODS OF PROBLEM FURTHER

3. formulate hypotheses for solving a new problem.

4. detect flaws in the design of experiments presented.

RECOGNITION FORM

Answer the following questions with respect to the data presented on pages 140 and 142.

1. Which of the following statements are –

   A. Sound and relevant

   B. Contradicted by the above data

   C. Not relevant to the above data.

   – Learning depends on practice.

   – Complete learning helps retention.

   – Meaning is of secondary importance for immediate memory.

   – Whole method is superior to part method.

   – Reminiscence is stronger than obliviscence.

   – Reinforced practice helps retention.

DIRECTIONS: Following is a partial case history. Applying Davis and Dollard's method of analysis, *blacken* the answer space corresponding to the letter of the *one* best answer or completion.

STATEMENT I: William was a good baby and seldom cried. He had no diseases in the early years and it might be said that he had a warm welcome from life.

1. Which one of the following comments on the above statement best represents the analytical approach used by Davis and Dollard?

   A– William will never develop any grave anxieties in his later life, on the evidence of lack of tension in babyhood.

Objective 10

	Poem A	*Poem B*
Gr. I	80%	60%
Gr. II	90%	70%
After six weeks :		
Gr. I	50%	20%
Gr. II	60%	60%
After six months :		
Gr. I	20%	5%
Gr. II	30%	5%

Essay :

(1) Draw relevant conclusions with respect to remembering and forgetting.

(2) What factors influence good retention ?

(3) Represent the data graphically.

(4) It is predicted that reproduction after an year will be as follows.

	Poem A	*Poem B*
Gr. I	2%	0%
Gr. II	5%	0%

Comment on this.

Aseh's result in the study on prestige-suggestion is interpreted by some (i) to support the traditional view of prestige-suggestion in the sense of blind faith and by others (ii) to support the gestalt view of perception as an organised whole.

(1) Point out the flaws if any in the design of the experiment.

(2) Point out the errors in interpretation.

(3) What factor has not been controlled in the study?

(4) Design an experiment to rule out the possibility of alternative interpretations.

(*Continued*) RECOGNITION FORM

B— A child given this start in life is certain to develop grave anxieties because of over-protection.

C— This start in life should contribute to security and lack of anxiety in later years, although other factors might later undermine this security.

D— William is unlikely to develop any severe ego conflicts.

STATEMENT II: William's mother subjected him to a very early and rigorous toilet training, beginning when he was three months old.

2. Which of the following comments on the above statement best represents the analytical approach used by Davis and Dollard?

A— This type of toilet training might produce anxious and defensive traits in later life.

B— This type of toilet training would make William neurotic.

C— This type of toilet training would not have a significant effect on William's personality.

D— This type of toilet training might make a child feel secure, since the expectations of his parents were so clear-cut.

STATEMENT III: William's mother was quite stern in training him and often whipped him. William's father said of his son: "He was the best boy you'd want to see. He listened to us like a trained animal and never did speak back".

3. Which of the following comments on the above statement best represents the analytical approach used by Davis and Dollard?

A— William's mother's training methods are characteristic of the lower class.

B— Such training would tend to make a child accommodating toward persons more powerful than he, but aggressive and bullying toward persons less powerful than he.

C— Such training would tend to make a child physically brave.

D— Such training would tend to make a child gentle and considerate with persons younger and less powerful than he.

Objective 10

STATEMENT IV: After he went to school William had a monotonously successful record and became an able social climber.

4. Which of the following comments on the above statement is most compatible with the analytical approach used by Davis and Dollard ?

   A— Any child who had been toilet trained as early as William would be mobile.

   B— William's social mobility is in no way connected with his mother's stern disciplinary practices.

   C— William's social mobility may spring from an attempt to escape his timid, cowering childhood.

   D— William's social mobility indicates that he is not troubled by anxieties.

DIRECTIONS: Below are some statistics relating to education and occupations. You are to judge what conclusions may be drawn from them.

	Occupational distribution found in a sample of male college graduates *	Distribution of occupations in the population as a whole, 1940
OCCUPATIONS	PERCENTAGES	
Executives, minor officials, partners, proprietors	23.5	9.1
Professional workers	51.3	4.7
Salesmen	6.0	Less than 1%
Skilled workers	7.1	33.8
Clerical workers	8.7	13.4
Unskilled workers	1.7	26.1
Farmers	1.7	13.0
	100.0	100.0

* You may assume that the sample selected is representative of all male college graduates in the United States.

(*Continued*) RECOGNITION FORM

Below are a series of statements relating to occupations and education. *Blacken* answer space

A— if the foregoing statistics alone are sufficient to prove the statement *true.*

B— if the foregoing statistics alone are sufficient to indicate that the statement is *probably true.*

C— if the foregoing statistics alone are sufficient to prove the statement *false.*

D— if the foregoing statistics alone are sufficient to indicate that the statement is *probably false.*

E— if the foregoing statistics alone are *not* sufficient to indicate whether there is any degree of truth or falsity in the statement.

1. Typically farmers are completely uneducated.
2. The professions absorb a larger percentage of male college graduates than any other group in the country.
3. Sons of unskilled workers and sons of farmers have an approximately equal chance to go to college.
4. Educational opportunity for the lower classes is increasing.
5. The same proportions of farmers and of unskilled workers are college graduates.

DIRECTIONS: The following generalizations are sometimes inferred from the foregoing statistics on occupations and industry. You are to judge whether or not the generalization made below can be made on the basis of this data alone or if certain additional data are needed. For the following items, *blacken* answer space

A— if the generalization can be made on the basis of the foregoing statistics, without any additional information.

B— if in addition to or instead of the foregoing statistics you would need to know the percentage of people in each occupation who were unable to attend college either for financial reasons or because of lack of academic ability.

C— if in addition to or instead of the foregoing statistics you would need to know the percentage of male college graduates in each

Objective 10

(*Continued*) RECOGNITION FORM

occupation whose fathers were college graduates and were in the same occupation.

D— if the generalization *cannot* properly be made even if the additional information described in B & C were available.

6. Unskilled, skilled and clerical workers do not value college education as much as do business men.

7. The low percentage of college graduates in the skilled, clerical, and unskilled worker class reveals a lack of social mobility in America.

8. Higher education provides a medium in this country whereby some youth improve their status.

9. Social mobility in the United States is increasing.

10. Children of business and professional men have a greater opportunity to enter well-paid occupations.

OBJECTIVE

THE STUDENT SHOULD DEVELOP SKILL IN THE USE OF

BEHAVIOUR

1. The student should be able to collect data by applying psychological and statistical techniques.
2. The student should be able to construct tests, administer them, and interpret the results.

ESSAY FORM

Here are a few situations. Determine in which case you will use an interview, a psychological test, or a projective method and justify your choice.

1. A young boy of 10 comes to you for help regarding his sleeplessness and inability to concentrate on studies.
2. A young man has been wanting to join your group. You want to know whether he would be a suitable member.
3. A person is constantly irritated by trifles.
4. An adolescent's father consults you regarding his son's plan of future study after the Matriculation Examination.
5. A young man consults you for lack of interest after five years of teaching work.

14 RECOGNITION FORM

PSYCHOLOGICAL AND STATISTICAL TECHNIQUES

3. The student should be able to understand the implications of diagnostic and prognostic tests.
4. The student should be able to attempt personality appraisals.
5. The student should be able to use proper psychological tools for appropriate situations.
6. The student should be able to know how methodology and techniques used in one field may be applied to another.
7. The student should know the limitations of various psychological and statistical tools.

RECOGNITION FORM

Mark each of the following statements

A— if it is true of projective techniques (Rorschach Ink Blot test or Murray Thematic Apperception test);
B— if it is true of the Personality Inventories (Bernreuter Personality Inventory or Bell Adjustment Inventory);
C— if it is true of the Interest Index 8.2a, 8.2b, 8.2c referred to in the Smith-Tyler reference.

1. The person taking the test must report his own symptoms.
2. Validity is most dependent on the conditions under which it is administered.
3. Greatest emphasis on number of symptoms rather than intensity of symptoms.
4. Greatest emphasis on items which differentiate known groups.
5. Requires the most training and skill to interpret.
6. Used to describe rather than classify individuals.
7. The "desirable" responses can be most easily recognized by a relatively naive subject.
8. Which of the following appear to be the most effective ways of improving the objectivity of an essay question?

Objective 14

In an examination a group of ten students obtained the following marks in the different subjects.

Names	*English*	*Math.*	*Psychology*	*Hindi*	*G. Knowledge*
A	42	80	70	46	72
B	46	72	64	52	86
C	64	60	61	56	36
D	36	63	46	61	40
E	64	46	73	47	30
F	56	65	72	39	81
G	62	46	62	43	72
H	53	61	59	35	75
I	60	58	49	42	76
Mean	45	60	60	55	65
O	10	15	8	9	20

1. Determine the individual rank of the students subject-wise and as a whole.
2. How would you say whether the group as well as the individual student has done better in English or General Knowledge?
3. Do you consider the group to be more homogeneous in Hindi or General Knowledge?

(Continued) RECOGNITION FORM

A— Remove all identifying material from the examination papers.

B— Have a large number of people grade the answers.

C— Secure agreement on the major points to be analyzed in the responses.

D— Correlate the essay responses with the answers to the objective questions.

E— Make certain that impartial observers, rather than teachers in the course, grade the papers.

F— Give students an adequate amount of time in which to write the essay.

G— Grade on the normal curve.

9. In general, the I.Q. remains constant during the age period 8-14. Which of the following factors in the construction and use of the tests help to account for this?

A— Test problems are selected which show a definite increase in successful performance from one age group to another.

B— Since mental age and chronological age are both defined in terms of number of months, the ratio of the two must always be constant.

C— The tests are usually used with groups of children whose intelligence remains constant.

D— The environment (home and school) are relatively constant for most children during this age period.

E— The scoring technique ignores the tests the student has passed which are over or under his true mental age.

F— The student is given less credit for passing tests at the younger ages than for older ages.

10. Scores on a vocabulary test made by three groups of students.

Group	*No. Students*	*Mean Score*	*Std. Deviation*	*Highest Score*	*Lowest Score*
Freshmen	232	34.28	16.75	83	3
Sophomores	68	39.44	14.94	75	1
Juniors	408	43.85	18.91	87	8

Objective 14

(*Continued*) RECOGNITION FORM

———— The group which is most variable.

———— Between which two groups is the difference most likely to be statistically significant.

———— The group with the smallest standard error of the mean.

———— Assuming a normal distribution, the group in which 84% of the students have a score of 51 or lower.

———— Assuming a normal distribution, the group in which 69% of the students have a score of about 46 or lower.

11. In the space before each of the following statements write:

Mean — if it is true of the mean
Median — if it is true of the median
Both — if it is true of both the mean and the median
Neither — if it is true of neither the mean nor the median

———— There are an equal number of cases above and below this point on a distribution.

———— It is always equal to the most frequent occurring score in the distribution.

———— It is most stable or reliable.

———— It is possible to combine the statistics from several different series if the size of each sample is known.

———— It is always equal to the 50th percentile.

———— Each item in a distribution contributes its proportionate share of the results.

HISTORY

OBJECTIVES

1. The student will develop an understanding of the facts of history.
2. The student will develop the ability to understand the present in the light of the past.
3. The student will develop the ability to understand the past in its own terms (sense of historical perspective).
4. The student will develop skill in recognizing major social forces behind historical change.
5. The student will develop the ability to place properly the contributions of various societies to human civilization.
6. The student will develop the ability to recognize and use the principal theories of historical interpretation.
7. The student will develop the ability to collect, organize, and interpret historical data.
8. The student will develop the ability to sift historical evidence and utilize all relevant reference material, including knowledge from fields outside history.
9. The student will develop the ability to think objectively and form independent judgments about historical material.
10. The student will develop the ability to present the subject logically, objectively, and coherently.

OBJECTIVE

THE STUDENT WILL DEVELOP THE IN THE LIGHT

BEHAVIOUR

The student can :

1. analyse the present day problems.
2. see the relationship between the historical forces and the present day happenings.
3. compare and contrast two sets of events, present and past.

ESSAY FORM

No essay questions were prepared for this objective.

2 RECOGNITION FORM

ABILITY TO UNDERSTAND THE PRESENT OF THE PAST

4. identify the evolutionary processes underlying the march of civilization
5. trace the development of historical trends and the major ideas and ideals of human progress.
6. refrain from idealizing the past (see the past objectively).
7. recognize cause and effect relationship in present and past events.

RECOGNITION FORM

DIRECTIONS: For each of the following political policies or events, *blacken* answer space

A– if it is best associated with the Federalist party;
B– if with Jeffersonian Democracy;
C– if with the Republican Party, 1860–1900;
D– if with Roosevelt's New Deal;
E– if with none of these.

1. Adoption of a Homestead Law for the distribution of government lands in the West.
2. Large-scale use of force to impose national policy upon state governments.
3. Very sharp identification with one side of the North-South line.
4. Successful support of major internal improvements on a national scale.
5. Adoption of the most ambitious civil rights legislation ever attempted by the national government.
6. Often regarded as special spokesman for large industrial interests.
7. Legalization of the income-tax.
8. Attempted to raise agricultural prices by curtailment of production.

Objective 2

9. Favoured a foreign policy friendly to England and hostile toward France.

10. Stood most consistently for a laissez-faire policy.

11. Stood most consistently for states' rights.

12. Colonial political history up to 1776 exhibits the following trends. Which might be regarded as democratic?

A— Representative institutions appeared in all the colonies, and the elected legislative bodies acquired important powers.

B— Gradually, elected executives replaced Royal Governors in most of the colonies.

C— Royal colonies were increasingly turned into proprietorships.

D— The new trans-Alleghany settlements gave increased political power to the common man, and made their governments more directly responsible to the popular will.

13. The American Revolution was a major experiment in democracy because

A— it gave the dominant position in American society to the classes which had been excluded from political participation under the imperial rule.

B— it created in America the democratic political institutions which Englishmen had enjoyed exclusively under the empire.

C— it effected a drastic levelling of property and wealth among the members of American society.

D— it made government in America more accessible to the people by eliminating the controls of an external sovereign.

14. An important development in the social history of the colonies which could be classified as an "experiment in democracy" was

A— the decreasing importance of indentured servants as the labour force for Southern agriculture.

B— the entrance of large numbers of German and Scotch-Irish immigrants, many of whom gradually emerged as free farmers.

(*Continued*) RECOGNITION FORM

C— the strengthening of anti-slavery sentiments among Northern merchants and shipmasters, which led them generally to abandon the African slave trade.

D— the rapid growth of large cities which became centres of democratic influence in opposition to the transitional conservatism of back-country farmers.

E— the virtual elimination of taverns and other such dens of vice, through the passage of "blue laws" in many of the colonies.

OBJECTIVE

THE STUDENT WILL DEVELOP THE ABILITY TO (SENSE OF HISTORICAL

BEHAVIOUR

The student can :

1. visualize the spirit of the time. (The student can recognize the major Social and Economic forces and the ideals operating at a particular time.)
2. place the events in chronological order.
3. identify the role of persons shaping the events.
4. identify and place individual or group motivation with regard to a particular event.

ESSAY FORM

Some points for short essays are given below on the topic of French Revolution.

1. What similar movements occured prior to the French Revolution ?
2. What were the effects of similar movements on the countries of Europe ?
3. Did any similar movements occur outside Europe about that time ?
4. What was the effect of contemporary economic conditions on the French Revolution ? How did that differ from conditions prevailing a century before in France?
5. What were the differences between the Economic conditions prevailing in France and in other States of Europe ?
6. What was the effect of Social conditions prevailing at that time ?
7. Did any changes occur in the realm of ideas which had a bearing on the Revolution ? Did that idea have or did not have roots in the ideas prevailing earlier ?
8. What was the influence of the French Revolution on the subsequent political, economic, social and theological ideas ?
9. What was the relationship of the idea of rationalism to the French Revolution ?

RECOGNITION FORM

UNDERSTAND THE PAST IN ITS OWN TERMS PERSPECTIVE)

5. perceive an event in an objective and detached manner.
6. visualize mentally the period of history he or she is studying.
7. relate the specific event to other events of the same nature either in immediate or remote past.
8. identify the long term consequences of particular historical events and situations.

RECOGNITION FORM

"When, in the course of human events, it becomes necessary for one people to dissolve the political bands which have connected them with another, and to assume, among the powers of the earth, the separate and equal station to which the laws of nature and of nature's God entitle them, a decent respect to the opinions of mankind requires that they should declare the causes which impel them to the separation.

"We hold these truths to be self-evident; that all men are created equal; that they are endowed by their Creator with certain unalienable rights; that among these are life, liberty, and the pursuit of happiness. That, to secure these rights, governments are instituted among men, deriving their just powers from the consent of the governed. That, whenever any form of government becomes destructive of these ends, it is the right of the people to alter or to abolish it and to institute new government, laying its foundation on such principles and organizing its powers in such form as to them shall seem most likely to effect their safety and happiness".

"Prudence, indeed, will dictate that governments long established should not be changed for light and transient causes; and accordingly all experience hath shown that mankind are more disposed to suffer, while evils are sufferable, than to right themselves by abolishing the forms to which they are accustomed. But when a long train of abuses and usurpations, pursuing invariably the same object, evinces a design to reduce them under absolute

Objective 3

despotism, it is their right, it is their duty, to throw off such government, and to provide new guards for their future security. Such has been the patient suffering of these colonies; and such now is the necessity which constrains them to alter their former systems of government. The history of the present king of Great Britain is a history of repeated injuries and usurpations, all having in direct object the establishment of an absolute tyranny over these states".

– Declaration of Independence –

DIRECTIONS: The Declaration of Independence is one of the fundamental American documents. Since its proclamation, the ideas which it sets forth have been confronted and discussed by men who inquired as to the nature of the American community or attempted to shape the policies of this community. This has been true of nearly every author whose writings you have read in Social Sciences. In the questions that follow, it will be necessary for you to bring your knowledge of their writings to bear upon the ideas of the Declaration.

For each of the following items, *blacken* the answer space corresponding to the *one best* answer or completion. There is only *one* right answer for each question.

1. Which of the following statements, if accepted as true, would *most fundamentally* undermine the argument presented in the Declaration of Indepedence?

   A– In "the opinion of mankind", as expressed in England and elsewhere, the Declaration contained great falsehoods and follies.
   B– There are no "self-evident" truths.
   C– Men often have overthrown governments "for light and transient causes".
   D– England had not actually placed the colonies "under absolute despotism".

2. "Unalienable rights" are those rights which

   A– do not require government for their effective realization.
   B– cannot be eliminated without the consent of the governed.
   C– belong to all individuals by virtue of their humanity, independent of government grant.
   D– belong to all individuals willing to make a government by voluntary compact and thereby to secure their civil liberties.

(*Continued*) RECOGNITION FORM

3. According to the Declaration of Independence, the people have a right to alter or abolish governments under certain circumstances because

   A— they have an unqualified right of revolution to protect their liberties.

   B— legitimate governments are instituted by consent to preserve unalienable rights, and forfeit their claim to obedience if they deny these rights.

   C— the people may institute new government, laying its foundation on whatever principles as to them shall seem most likely to effect their safety and power.

   D— governments derive "their just powers from the consent of the governed", and the people may give or withdraw their consent as they please.

4. In accord with the logic of the Declaration of Independence, any people who want to alter or abolish their government and to institute a new one must

   A— demonstrate that the existing government has become destructive of man's unalienable rights instead of preserving them.

   B— prove that the existing government was originally formed without their consent.

   C— show that they could be safer and happier under a new government.

   D— prove that they have unalienable rights.

5. The long list of grievances contained in the Declaration of Independence has the purpose of

   A— listing all the unalienable rights which the colonists wish to claim.

   B— showing that England has in fact established an absolute despotism over the colonies.

   C— proving that it is the clear intention of England to establish an absolute tyranny over the colonies.

   D— showing in how many ways a new government would improve the life of the colonists.

Objective 3

6. This history of grievances of the colonies against England contained in the Declaration of Independence has the further purpose of

   A— establishing the new principles which ought to determine the form of the new government the colonists seek to establish.

   B— showing how many reforms would be necessary if the present government were not to be overthrown.

   C— proving that the colonists are not acting with haste or without prudent constraint in seeking to establish themselves as an independent state.

   D— demonstrating that England does not accept the idea that men have unalienable rights.

7. Adam Smith's *Wealth of Nations* appeared in the same year as the Declaration of Independence. If asked to comment upon this fact, it is likely that Smith would have stated that

   A— it was only an interesting coincidence of no significance since the contents of the two statements were unrelated.

   B— seldom in history had a political forecast been more dramatically confirmed than had the Declaration confirmed his prediction (in the section "Of Colonies") that unless England refrained from invading the colonists' sacred rights, war would result.

   C— the Declaration was a statement of political principles, while his work was addressed to economic matters; and further comment was idle since political and economic affairs must be separated, according to *laissez-faire* doctrine.

   D— it was obviously more than coincidence, since the fundamental doctrines of liberty contained in both statements were complementary and looked to the organization of basically similar societies.

8. From Smith's statements in the *Wealth of Nations,* it is clear that he would have

   A— been hospitable to the idea of equality set forth in the Declaration, as well as to the principles of liberty which could support the free economy he advocated.

   B— regarded the Declaration of Independence as a great disaster, for it meant the partial dissolution of the mercantilist system which

(*Continued*) RECOGNITION FORM

Smith believed would maximize the wealth of England and of the colonies.

C— regarded the Declaration of Independence as a great disaster, since the independence of America decreased the possibilities for establishing a truly international system of free economic exchange.

D— felt that the nature of men was such that the principles of the Declaration of Independence could never be realized, for ordinary men were too narrowly self-interested to understand how to use their freedom for the good of society.

DIRECTIONS: Read the following sets of statements carefully. *All* of the statements are historically *true*. However, in each set of four statements, *one* of the statements belongs to a period of time *different* from that period represented by the other three statements. *Blacken* the answer space corresponding to the *one* statement which refers to a *different period of time* than the other three.

1. Colonial Development (to 1776)

A— There were important examples of tension between colonists who advocated religious liberty and others who desired an officially established religion.

B— There were important examples of conflict between imperial interests and a developing American identity.

C— There were important examples of conflicting class interests.

D— There were important examples of conflict between the agricultural interests and regions and the manufacturing interests and regions.

2. Revision of British Imperial Policy toward America (After French and Indian War)

A— The first set of Navigation Acts were passed.

B— The area west of the Alleghanies was closed to general exploration and settlement.

C— The powers of the colonial assemblies were circumscribed by a strengthening and extension of the system of royal governors.

D— A number of leaders in different colonies established extra-legal

Objective 3

committees of correspondence to help organize resistance to the new imperial policies.

3. Period of the Articles of Confederation

A— Several states undertook the management of Indian affairs.

B— A depression resulted in extreme hardship and some unrest along the frontiers.

C— State governments created barriers to interstate commerce.

D— Certain states announced as doctrine the rights of the states to nullify oppressive national tariff laws.

4. The New National Government (to 1800)

A— Congress created a Department of State, a Department of War, and a Department of the Treasury.

B— The Northwest Ordinance established the procedures by which newly settled territories to the west could achieve statehood.

C— The doctrine of "implied powers" succeeded in its first crucial test.

D— Resentment over conduct in foreign affairs and over curtailment of civil liberties at home laid the basis for a change in national policies.

DIRECTIONS: Four chronological periods are listed below. Under each period are grouped several descriptive statements. For each statement, *blacken* answer space

A— if it correctly applies to the period named;

B— if it does *not* apply to that period but to an *earlier one;*

C— if it does *not* apply to that period, but to *later one;*

D— if it does not apply correctly to *any* period of American history.

Period: 1760 — 1828

1. First protective tariff was passed by Congress.
2. Political parties appeared in the U.S. for the first time.
3. Texas became a part of the United States.
4. Some trade unions and some labour parties existed by the end of the period.

(*Continued*) RECOGNITION FORM

5. The basic principles followed for a century of American colonization were formulated and enacted into law.
6. The Supreme Court first declared an Act of Congress unconstitutional.
7. The first National Bank was established.

Period: 1829 – 1865

8. At the beginning of the period most adult white males had the right to vote for members of the House of Representatives.
9. Precedent against a third-term election of American President was first established.
10. The Humanitarian Movement flourished.
11. The first federal anti-trust act was passed.
12. The Monroe Doctrine was first officially proclaimed.
13. Congressional reconstruction of the South was carried through.
14. First federal financial aid to internal improvements was given.
15. Louisiana was purchased from France.
16. The Missouri Compromise was enacted.

II 1. In their attitude toward the money question, which of the following form a consistent group?

A– The followers of Daniel Shays: the Jacksonian Democrats; the Bryan Democrats
B– The Hamiltonian Federalists; the Whigs; the Gold-standard Republicans
C– The Jeffersonian Democrats; the Jacksonian Democrats; the Gold-standard Republicans
D– The Jeffersonian Democrats; the Jacksonian Democrats; the Populists

2. The political controversies of the early 1770's between radicals and conservatives can best be understood as

A– differences over the amount of democracy to be included in the new state governments.

Objective 3

B— differences arising out of the antagonistic ideas of Southern planters and Northern free farmers.

C— differences over the method, pace, and limits of the colonial protest against British policy.

D— differences arising out of the constrasting views of Eastern aristocrats and Western democrats.

E— differences over the merits of a planned imperial economy (mercantilism) as against a free-trade empire.

1. Which of the following is the best description of the pattern of society in the 18th century colonies?

A— A system of fixed castes ranging from the slave at the bottom, through the indentured servant, the free workman, the small farmer, to the nobility at the top

B— A system of voluntary contracts among substantially equal individuals differentiated only by the amount of wealth they possessed

C— A hierarchy of social classes ranging from the nobility at the top, who controlled the society, to the indentured servant and slave at the bottom, who did the heavy work

D— A hierarchy of social classes in which individuals moved up and down with comparative ease and speed, except the black slaves, and in which a very large number objected to the continuance of well-defined classes

2. Which of the following *best* describes the followers of Jefferson in his successful attack upon the Federalists?

A— Farmers, debtors, Westerners

B— Debtors, planters, indentured servants

C— Farmers, merchants, planters

D— Westerners, creditors, farmers

3. As compared with the Republican Party of 1800 the Populists of 1892

A— were not a political party but a pressure group of farmers.

B— constituted a minority faction according to their own admission as that term is used in *The Federalist.*

(Continued) RECOGNITION FORM

C— polled no electoral votes for president.

D— appealed to a group that had diminished in its relative size in proportion to the whole population.

V. For schematic purposes the French Revolution may be divided into three phases preceding the Thermidorian reaction:

1. A liberal or constitutional monarchy phase (May, 1789—August 8, 1792)
2. A moderate republican phase (August 9, 1792—June, 1793)
3. A radical republican phase (June 2, 1793—July 28, 1794)

The following items contain statements that describe an event of one, three, or none of these phases or express a dominant aim or achievement of the regimes in these periods.

Blacken answer space

A— if the statement applies to the first phase;

B— if the statement applies to the second phase;

C— if the statement applies to the third phase;

D— if the statement applies to all three phases;

E— if the statement applies to none of the phases.

1. Power is concentrated in the hands of a Committee of Public Safety.
2. The revolutionaries are concerned with the question of the fundamental rights of man.
3. Organized religion has falsified and subverted the idea of the Divinity, and a new religion, compatible with the enlightenment of the Revolution, must be given to the people.
4. Marriage is secularized and divorce is legalized.
5. France is engaged in external war.
6. France commits herself to the support of revolutionary movements everywhere.
7. The existing regime is subject to criticism from the left.
8. The policy of the government becomes conservative at home but continues revolutionary abroad.

Objective 3

9. A blockade against England (the Continental System) is instituted.
10. The nobility and the clergy lose most of their class privileges.
11. The Girondins represent the left wing of the Legislative Assembly.
12. The Girondins represent the right wing of the Convention.

VI. For the following items *blacken* the answer space corresponding to the revolution or revolutions to which each statement is applicable. Some of the items require two answers, others only one answer.

A— The Puritan Revolution
B— The French Revolution of 1789
C— The Russian (Bolshevik) Revolution
D— All of these
E— None of these

1. The revolution attempted to do away with political, economic, and social abuses of long standing, and there was a demand for fundamental reforms in the social and political structure of the nation.
2. Many of the revolutionary principles were based upon a national tradition of long standing, and an important immediate cause of the revolution was a violation of what were considered traditional rights.
3. Some of the revolutionary theoreticians tended to plan their programmes or justify their acts by reference to a compact theory of government based on natural rights.
4. The revolutionist identified certain forms of organized religion with political and economic repression and social injustice.
5. As in the Corcyraean revolution, each faction allied itself with, and sought the support of, a great foreign power.
6. The basic revolutionary theory was of foreign origin, and some of the revolutionists themselves had some doubts as to its applicability to the local situation.
7. The existing revolutionary regime had to contend not only with right-wing forces which it had displaced but also with left-wing extremists.

(*Continued*) RECOGNITION FORM

8. Fear of anti-revolutionary intervention on the part of foreign governments stimulated national spirit and helped to produce internal solidarity.
9. Reorganization of the class structure was a basic element in the aims of the strongest revolutionary group.
10. The revolution resulted in large-scale transfer of property and a decisive shift in the relative strength of social classes.
11. The original aims of the revolution remained intact and changes in ideology and practice were negligible.

OBJECTIVE

THE STUDENT WILL DEVELOP THE ABILITY TO COLLECT,

BEHAVIOUR

The student can :

1. state clearly the precise nature and scope of his problem.
2. prepare a bibliography of published documents, contemporary historical literature, journals, etc.
3. draw up a list of inscriptions, coins, archaeological remains, etc., relevant to some given topic.
4. distinguish between original and secondary Sources.

ESSAY FORM

Note:—

The term paper suggested for objective 10 could be used as a project for this objective too.

Essay Questions

1. Discuss the views given in primary and secondary sources on the Mutiny of 1857? Could they be classified as British and Indian views?
2. What was the composition of the Bengal army and how was it recruited?
3. How did the Bengal army differ from the Madras and Bombay armies?
4. Describe the causes of discontent in the Bengal army prior to 1857? How did the General Enlistment Acts affect the interest of Bengal armies?

Suggested Test situations for objective type tests

1. Extracts from primary and secondary sources are given and the student has to distinguish between them.
2. Extracts from British and Indian works are given and the student is asked to classify them under two views.

7 RECOGNITION FORM

ORGANIZE, AND INTERPRET HISTORICAL DATA

5. grade the material collected according to the significance to that topic.
6. collect relevant information from the historical places that he visits.
7. consult libraries properly (Index, Catalogue, Encyclopaedia, references, etc.).
8. arrange his material under suitable headings.
9. analyse and interpret the data.

RECOGNITION FORM

Thomas Jefferson to James Madison, Jan. 30, 1787

...I am impatient to learn your sentiments on the late troubles in the Eastern States [Shays' Rebellion]. So far as I have yet seen, they do not appear to threaten serious consequences. Those States have suffered by the stoppage of the channels of their commerce, which have not yet found other issues. This must render money scarce, and make the people uneasy. This uneasiness has produced acts absolutely unjustifiable; but I hope they will provoke no severities from their governments. A consciousness of those in power that their administration of the public affairs has been honest, may, perhaps, produce too great a degree of indignation; and those characters, wherein fear predominates over hope, may apprehend too much from these instances of irregularity. They may conclude too hastily, that nature has formed man insusceptible of any other government than that of force, a conclusion not founded in truth nor experience. Societies exist under three forms, sufficiently distinguishable. 1. Without government, as among our Indians. 2. Under governments, wherein the will of every one has a just influence; as is the case in England, in a slight degree, and in our States, in a great one. 3. Under governments of force; as is the case in all other monarchies, and in most of the other republics. To have an idea of the curse of existence under these last, they must be seen. It is a government of wolves over sheep. It is a problem, not clear in my mind, that the first condition is not the best. But I believe it to

Objective 7

3. A number of extracts are given and the student is asked to determine which are relevant, less reliable, or unreliable from the internal evidence given.

(*Continued*) RECOGNITION FORM

be inconsistent with any great degree of population. The second state has a great deal of good in it. The mass of mankind under that enjoys a precious degree of liberty and happiness. It has its evils, too; the principal of which is the turbulence to which it is subject. But weigh this against the oppressions of monarchy, and it becomes nothing. *Malo periculosam libertatem quam quietam servitutem.* [I prefer freedom with danger to slavery with ease.] Even this evil is productive of good. It prevents the degeneracy of government, and nourishes a general attention to the public affairs. I hold it, that a little rebellion, now and then, is a good thing, and as necessary in the political world as storms in the physical. Unsuccessful rebellions, indeed, generally establish the encroachments on the rights of the people, which have produced them. An observation of this truth should render honest republican governors so mild in their punishment of rebellions, as not to discourage them too much. It is a medicine necessary for the sound health of government.

1. The central proposition of Jefferson's letter may be restated in this way:

   A— Although the trouble-makers in the Eastern States took unjustifiable steps in a bad cause, they deserve our admiration for their courage in resisting "quiet servitude".

   B— Fearful men, distrusting human nature, falsely assert that disorder is a political evil.

   C— Although popular governments are abliged to suppress rebellion, they are well advised to treat the rebels generously and attend to their grievances.

   D— The abolition of government is the true ideal toward which men should strive, even if they can never fully realize that ideal in large, civilized communities.

2. If Jefferson had been Governor of Massachusetts during Shays' Rebellion, it is most likely that he would have

   A— resigned his office, rather than take the part of the "wolves" against the "sheep".

   B— granted most of the rebel demands on the ground that they represented the voice of the people; and invited the leaders to accept responsible positions in the state government.

   C— used the force necessary to disarm the rebel bands, granted

Objective 7

amnesty to their leaders, and proposed policy reforms to the official government.

D— issued a proclamation containing the chief doctrines of the Declaration of Independence, and left it to the people of the state to judge what should be done.

E— urged the rebel commanders to stop when they had achieved their legitimate purposes, and not to give rebellion a bad name by instituting a bloody reign of terror.

3. A fundamental political tenet underlying Jefferson's argument is that

A— a little liberty is a dangerous thing: men must choose between complete freedom and unlimited authority.

B— anarchy is a better state than tyranny, and possibly the best state for man; but it is not a real alternative for American society.

C— rebellions are a wholesome, if rather bitter, medicine for government, since they generally lead men a little closer to the ideal of society without government.

D— government is a necessary evil, but it should be stripped of power, since all power tends to corrupt.

E— All of the above.

4. A further underlying proposition is that

A— the perils of extensive liberty in the hands of the people, however great, are less serious than the perils of arbitrary power in the hands of officials, whether royal or republican.

B— men in general have the capacity for self-government.

C— rebellions in general are a sign of public health, showing that men care enough about their rights to defend them at great risk.

D— rebellions in general are a sign of public degeneracy, in that they testify to governmental encroachments on popular liberties.

E— all of the above.

5. Viewed in the larger context of Jeffersonian political thought, this Jefferson letter states a position

A— which contradicts the general Jeffersonian purpose of building a better and stronger America.

(Continued) RECOGNITION FORM

B – which is consistent with the general Jeffersonian attitude of suspicion toward governmental power.

C– which exemplifies the general Jeffersonian attitude of fear of, and hostility toward, the property rights of the rich.

D– which has no significant relation to the central concerns of Jeffersonian Democracy.

E– none of the above.

6. The political views stated in this letter are most closely related to Jefferson's arguments

A– against the Alien and Sedition Acts.

B– for the Louisiana Purchase.

C– against the natural aristocracy.

D– for the exclusion of slavery from the Northwest Territory.

E– against the prosecution of Aaron Burr as a traitor.

7. In the Jeffersonian political philosophy, the need for the revolutionary "medicine".

A– can be reduced by guaranteeing freedom of public discussion.

B– can be reduced by establishing constitutional limits to political power.

C– can be reduced by providing a regular channel for "legal revolution"–i.e., constitutional amendment.

D– can *not* be eliminated by trusting to the good will of democratically elected officials.

E– all of the above.

DIRECTIONS: Read the following quotation carefully. For each of the items following, *blacken* the answer space corresponding to the *one best* completion.

"And what are the different classes of legislators but advocates and parties to the causes which they determine? Is a law proposed concerning private debts? It is a question to which the creditors are parties on one side and the debtors on the other. Justice ought to hold the balance between them. Yet, the parties are, and must be

Objective 7

themselves the judges; and the most numerous party....must be expected to prevail".

Madison – *Federalist,* No. 10

1. The solution which Madison proposes to the problem described in the quotation is a government which

   A– performs its functions in a society free from faction.

   B– would render it difficult for the majority to concert and execute certain acts.

   C– provided by law that no measure affecting property could be passed by the legislature.

   D– banned any party which was grounded in factionalism.

   E– succeeded, as he felt the Constitution would, in providing laws which were a clear expression of the popular will.

2. This solution could be achieved, Madison thinks, through

   A– a constitution which embodies checks and balances and thus can prevent domination by the propertied minority.

   B– reducing through education and wise laws the diversity of interests among the citizens.

   C– a parliamentary republic characterized by a few large parties.

   D– a popular government in an extensive and populous country.

   E– a small representative government.

3. Further, Madison believes that a successful solution required

   A– the election of representatives by the people.

   B– that all existing parties would put the country's welfare above their own.

   C– a major dependence on good statesmanship to control the effects of faction.

   D– a way of electing the legislature which would make them sensitive to changes in popular opinion.

4. The solution named in item 2 assumes that

   A– there are only a few important issues which may serve as a basis for factions.

(*Continued*) RECOGNITION FORM

B— all people are substantially equal in abilities and thus can be brought to agree with one another on important problems.

C— diversity of physical environment would create a diversity of interests.

D— the more responsive a government is to the popular will, the better it is.

OBJECTIVE

THE STUDENT WILL DEVELOP THE ABILITY OBJECTIVELY, AND

BEHAVIOUR

The student can:

1. keep constantly in mind the central problem to be tackled.
2. express the problem in clear and simple language.
3. arrange facts and arguments logically in relation to the problem.

ESSAY FORM

Note: Some techniques of testing suggested by the group are described below.

1. Essays or term papers fairly comprehensive in scope, e.g., Indian National Movement.
2. Passages from historical texts are to be given to student and he may be asked to place them in their proper contexts, clarify them, and bring out their significance.
3. An indirect method would be to give the student a well written and a poorly written account and ask him to compare.
4. The student may be asked to prepare outlines on historical topics.
5. The student may be asked to rearrange relevant passages given in a jumbled way from historical data.

Essay I

"The idea of liberty, as formulated in the eighteenth century, although valid enough for that time, has in one fundamental respect ceased to be applicable to the situation in which we find ourselves. In the eighteenth century the most obvious oppressions from which men suffered derived from governmental restraints on the free activity of the individual. Liberty was therefore naturally conceived in terms of the emancipation of the individual from such restraints. In the economic realm this meant the elimination of

10 RECOGNITION FORM

TO PRESENT THE SUBJECT LOGICALLY, COHERENTLY

4. express himself concisely.
5. avoid irrelevance in presenting the subject.
6. give suitable illustrations to substantiate his arguments.
7. support the arguments and observations with proper reference.
8. present the subject without his personal bias.

RECOGNITION FORM

Note: The very nature of this objective requires some evidence of the student's writing or speaking. The recognition form is not relevant here.

Objective 10

governmental restraints on the individual in choosing his occupation, in contracting for the acquisition and disposal of property, and the purchase and sale of personal services. But in our time, as a result of the growing complexities of a technological society, [a] the emancipation of the individual from governmental restraint in his economic activities has created new oppressions, so that [b] for the majority of men liberty, can be achieved only by an extension of governmental regulation of competitive business enterprise".

A

Defend or attack the truth of proposition [a] above. In doing this take into consideration specific conditions in the areas of economic and political life in America from the Civil War to the present.

DIRECTIONS: Read the essay assignment *carefully*. You are to write *both Part A and Part B* of the assignment. Organize your ideas *before* you start to write. In your analysis, show clearly the interrelationship of the pertinent ideas and arguments. If you introduce historical facts, integrate them into your argument or exposition. Make an attempt to develop fully the ideas you introduce. *You will have one hour* for this part of the examination.

ESSAY

(Time: one hour)

Liberty and Equality are, by common agreement, central and persistent themes in American political tradition.

Part A

Discuss liberty and equality as they are treated in the writings of

1. John Locke and the Declaration of Independence,
2. Alexis de Tocqueville, and
3. *two* of the following:

(a) Thomas Jefferson, (b) William G. Sumner, (c) Edward Bellamy, (d) Henry Simons. In your discussion make clear how each author or document *defines* liberty and equality, and explain the *relation* each sees between the two terms.

(Suggested time: 40 minutes)

(Continued) RECOGNITION FORM

Objective 10

Part B

Do you regard liberty and equality as consistent or antagonistic political values? In discussing this question be sure that you

(1) *state* your position *clearly,* and

(2) *defend* your position, drawing explicitly upon the arguments, problems, and examples presented by the authors discussed in Part A above, or by other clearly relevant authors considered in the course.

Your answer will be judged, not by the position you take, but by the skill and knowledge you exhibit in defending that position.
(Suggested time: 20 minutes)

CHEMISTRY

OBJECTIVES

1. The students will acquire knowledge of the basic facts and principles of Chemistry.
2. The students will develop manipulative skill and the ability to use scientific apparatus.
3. The students will be able to perform experiments and give evidence of appropriate use of the scientific method.
4. The students understand the interrelationships between various branches of chemistry.
5. The students are able to apply chemistry to daily life.
6. The students will be aware of the impact of discoveries in chemistry on related fields such as Physics, Biology, Medicine etc.
7. The students will develop an attitude of enquiry.
8. The students will develop the ability to present and interpret chemistry research and findings in a clear and meaningful form.
9. The students will develop an appreciation of nature.
10. The students understand the impact of discoveries in chemistry on the social structure and economic life and conditions of the people.
11. The students will develop the ability to analyse and understand the social and industrial problems in which science is involved.

OBJECTIVE

THE STUDENTS WILL ACQUIRE KNOWLEDGE OF THE

BEHAVIOUR

1. The students are able to give examples and illustrations, on their own, of principles of chemistry.
2. The students are able to translate symbols and formulae into other terms.
3. The students are able to compare the new against the known facts.

ESSAY FORM

1. Write the electronic formulae for the following:
   (a) H_2SO_4, (b) $BiCl_3$, (c) H_2O_2, (d) SO_3, (e) Chlorine Dioxide, (f) Perchloric acid.
2. An element belonging to Group II (a) has an atomic weight 225.97 and forms a sulphate. What will be the solubility of this sulphate compared to the sulphates of alkaline earth metals? (b) An element belonging to Group I (a) has an atomic weight 132.81 and forms an hydroxide. What will be the strength of this hydroxide compared to other hydroxides of alkaline metals?
3. Indicate the common name and normal uses of the following:
   (1) K_2SO_4, Al_2 $(SO_4)_3$, 24 H_2 O
   (2) Ca-OCl_2
   (3) $2PbCO_3$. P_6 $(OH)_2$
   (4) $(NH_4)_2$ SO_4
   (5) $Na_2B_4O_7$
   (6) $CaSO_4$, $\frac{1}{2}$ H_2O
   (7) $Na_2S_2O_3$
   (8) $NaHCO_3$
4. An alcohol $C_5H_{11}OH$ gives a ketone on oxidation, when it is dehydrated and the resulting alkene is oxidised, a mixture of ketone and an acid results. What is the structure of the compound?
5. Two amines (A and B) of formula C_3H_9N were treated with $C_6H_5SO_2$-Cl in a water solution of NaOH. A gave a sold precipitate C which

1 RECOGNITION FORM

BASIC FACTS AND PRINCIPLES OF CHEMISTRY

4. The students are able to recognize the chemicals used in daily life with reference to food, clothing, detergents, medicine, transport, and luxuries, etc.

5. The students are able to make the necessary computations and transformations in solving chemical problems.

RECOGNITION FORM

1. The theory that equal volumes of gases at the same temperature and pressure contain about the same number of molecules is based most directly on

   A— the assumption that molecules of gas consist of two atoms.
   B— the law of combination in definite proportions by weight.
   C— the concept that a gram-molecular weight of a gas occupies 22.4 liters at standard conditions.
   D— the law that gases react in simple volume ratios.
   E— experiments in which molecules are automatically counted as they stream through a capillary.

2. Which of the following facts best supports the theory that electrons may be lost from energy levels within the outermost level of the atom?

   A— Tin forms both stannous and stannic compound.
   B— Chlorine exists not only as Ct ion, but also in oxidation levels of +1,+3,+5, and +7.
   C— Even the inert gases can be ionized under suitable conditions.
   D— Some elements can form covalent as well as ionic bonds.
   E— Sub-group elements, such as copper, can exhibit more than a single ionic valence.

3. Which of the following facts best supports the theory that not all the molecules of a given substance have the same kinetic energy?

Objective 1

was insoluble in acid. B gave a clear solution which gave solid precipitate D on acidification. Give possible structures for A, B, C, and D.

6. A well-known insecticide, gammexane, contains 25.3% Carbon, 2.1% Hydrogen and 72.6% Chlorine. The molecular weight is about 285. Give the empirical formula and the molecular formula of gammexane.

7. A monacid organise base gave on analysis the following results: 0.1413 gm of substance gave 0.3582 gm CO_2 and 0.1904 gm H_2O. 0.1237 gm of substance gave 17.85 cc of dry nitrogen at 270C. and 750 mm. Its Platinichloride contains 33.4% Pt. Determine its molecular formula.

8. Interpret fully the following equations:

(i) $P.V. = iRT$

(ii) $P + F = C + 2$

(iii) $$\frac{(A+) \times (B')}{(AB)} = K$$

(iv) $$K = \frac{1}{t} \times \frac{x}{a(a-x)}$$

9. The atomic weight of thorium is 232.12 and its atomic number is 90; in the course of its radioactive disintegration six *a* and four *b* particles are emitted. What is the atomic weight and atomic number of the end product?

10. State the laws of chemical combination. Three oxides of lead were found to contain respectively 92.83%, 90.65% and 86.62% lead and 7.17%, 9.35% and 13.38% oxygen. Show which law these figures illustrate.

(*Continued*) RECOGNITION FORM

A— Gases can be liquefied.

B— When certain gases are allowed to expend rapidly, they become cooler.

C— Gases exert higher pressures when their temperatures are raised, if the volume remains constant.

D— Hydrogen diffuses more rapidly than does chlorine.

E— Ice evaporates even if its temperature remains far below the melting point.

4. Which of the following constituted the best verification of the periodic law?

A— the discovery of new elements having properties predicted earlier.

B— the finding that differences in atomic weight follow a definite pattern.

C— the discovery of radioactivity.

D— the fact that certain elements possess similar properties.

E— the discovery that atoms of the same element may have different masses.

5. Of the following, which compound is most hydrolyzed in 0.1-molar water solution?

A— Na_2HPO_4

B— NaH_2PO_4

C— $(NH_4)_2HPO_4$

D— $NH_4H_2PO_4$

E— None of these compounds is hydrolyzed; all are salts.

6. Crystals of K_2SO_4 do not conduct electricity. This is primarily because

A— there are no free electrons present.

B— nonmetallic solids have a high resistance.

C— there are covalent bonds in the crystals.

D— the ions in a crystal can not acquire translational motion.

E— K_2SO_4 may be dissociated in the solid state; but it is not necessarily ionized.

Objective 1

(*Continued*) RECOGNITION FORM

7. Of the following, which compound or ion is capable of behaviour either as an acid or base in water solution?

A– NH_3
B– NH_4+ Ion
C– HCO_3-Ion
D– H_3PO_4
E– None of these.

8. An element is said to be electronegative if it

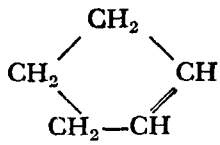
A– tends to form simple (monatomic) negative ions.
B– reacts with negative ions.
C– migrates to the negative electrode on electrolysis.
D– does not tend to lose electrons.
E– cannot be a component of a positive ion.

9. What is formed when the ore FeS is heated strongly in a current of air?

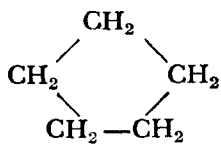
A– Fe_2O_3 and SO_2
B– FeO and SO_2
C– $FeSO_3$
D– Fe and SO_2
E– No reaction occurs.

10. Which of the structures below is isomeric with $CH_3\ CH_2\ CH = CHCH_3$?

A–



B–



C– $CH_3\ CH_2\ CH_2\ CH_2\ CH_3$
D– $CH_3\ CH_2\ C \equiv CCH_3$
E– None of these.

OBJECTIVE

THE STUDENTS WILL DEVELOP MANIPULATIVE SKILL

BEHAVIOUR

1. The students choose the right kind of apparatus and chemicals for solving the problem.
2. The students set right a defective apparatus.
3. The students know the precautions in the handling of apparatus and chemicals.
4. The students know how to assemble the apparatus.

Note: This objective can best be appraised by observing the student at work in laboratory situations especially when he is confronted with new problems to which he can apply techniques previously learned.

ESSAY FORM

1. If you have to determine the solubility of the given salt in water at 25°C and 50°C, what would be your precautions in the procedure ?
2. You have to prepare 20g of pure ethyl acetate. Outline the details of procedure.
3. You have to determine gravimetrically the amount of calcium present in the whole of the given solution. How would you arrange the equipment? How would you arrive at the necessary data?
4. You have to determine volumetrically the amount of copper in the whole of the given solution. How would you assemble the apparatus?
5. The following results were obtained in the decomposition of nitrogen pentoxide in cc 14 solution at 40°C. The reaction rate was followed by measuring the amount of decomposition x in terms of the volume of oxygen liberted after various times t sec.

t	600	1200	1800	2400	3000	sec.
x	6.30	11.40	15.53	18.90	21.70	34.75 cc

Determine the order of the reaction from the above data.

AND THE ABILITY TO USE SCIENTIFIC APPARATUS

5. The students suggest, devise, or conduct an experiment in an alternative way.
6. The students correctly calculate from the observed data and arrive at precise conclusions.
7. The students can diagnose or detect the cause of errors.

RECOGNITION FORM

1. If phosphate ion is present, the ions which may possibly escape detection during analysis are those of

   A— iron, chromium, and aluminium.
   B— arsenic antimony and bismuth.
   C— tin and lead.
   D— calcium, strontium, barium and magnesium.
   E— zinc, manganese, cobalt and nickel.

2. An analyst, after precipitating the copper-arsenic group fails to readjust the PH and resaturate the solution with hydrogen sulfide. The ions which may possibly escape detection as a result are those of

   A— tin and antimony.
   B— bismuth, mercury and copper.
   C— lead and cadmium.
   D— arsenic.
   E— cobalt, nickel and zinc.

3. Which of the following tests is most satisfactory for detecting sulfide ion in the presence of the sulphate ion?

Objective 2

A— Carry out barium chloride test in neutral solution.

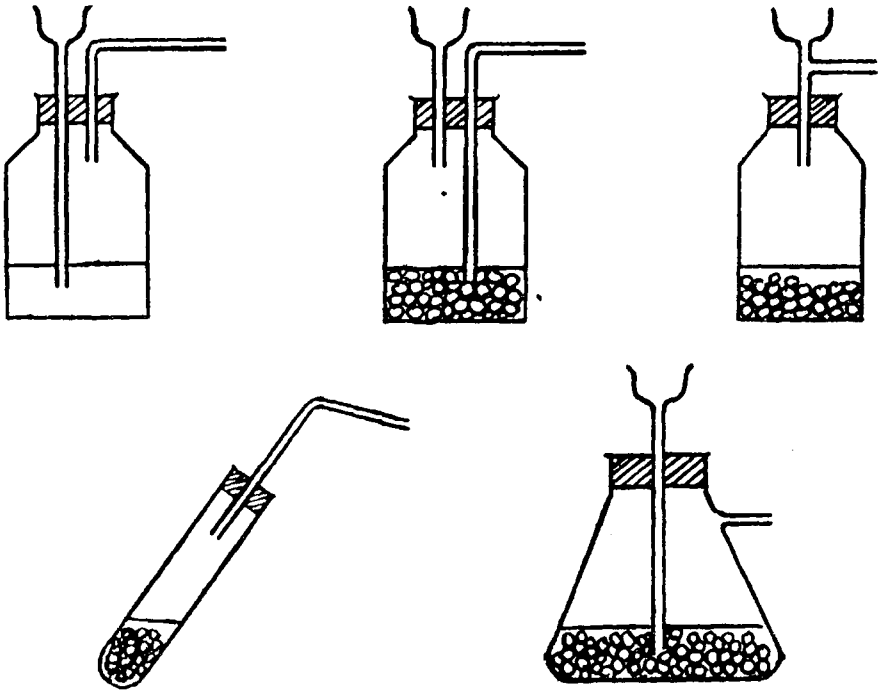
B— Oxidize with permangenate and then add barium chloride.

C— Precipitate $BaSO_4$ in strongly acid solution, filter, make filterate alkaline, and add chloride.

D— Add a strong reducing agent to destroy sulphate ion and add barium chloride.

E— Acidify and pass any evolved gas into barium chloride solution containing some free bromine and HCl.

4. Which of the following pieces of apparatus would be best for producing a gas by reaction of a solid with a liquid?



5. A reaction at room temperature between two nearly immiscible liquids is to be carried out in the shortest time. An experienced chemist would be most likely to

A— shake the mixture so violently that a stable emulsion would result.

(*Continued*) RECOGNITION FORM

B— add a solid having a great surface area.

C— use a mechanical stirrer with its propellor blades at the interface.

D— swirl the contents to give a rapid circular motion.

E— pour the denser liquid slowly into the other.

6. A common method for determining the molecular weight of a volatile liquid consists in (1) weighing a flask of known volume and having a small opening, (2) adding a small amount of the liquid, (3) heating the flask in boiling water, (4) cooling the flask, and (5) weighing the flask and contents.

7. Of the following, which would cause the most serious error?

A— Failing to take the weight of air in the flask into account.

B— Failing to read the exact temperature of the boiling water.

C— Having some of the liquid in the flask during the final weighing.

D— Failing to weigh accurately the liquid added to the flask.

E— Failing to vaporize all of the liquid during the heating operation.

OBJECTIVE

THE STUDENTS WILL BE ABLE TO PERFORM USE OF THE

BEHAVIOUR

1. The students are able to show evidence of correct observation.
2. The students are able to devise an experiment to check up a principle or idea.
3. The students are able to know the limitations of their own experiment.

Note: This objective can be appraised by the use of new problem situations in the laboratory.

ESSAY FORM

1. You are given a solution of cane sugar acidified with dilute sulphuric acid. Perform a suitable experiment to determine the changes that take place and give the necessary explanation.
2. Perform a suitable experiment to determine the distribution of phenol between water and chloroform. What inferences should be drawn from the resultant data?
3. You are given a sample of water. Perform experiments to find whether the given sample can be used for domestic purposes.
4. You are required to identify the given sample of organic substance and confirm by preparing a suitable derivative. Outline the details of the experiment.
5. Experiments on the ratio of distribution of phenol between water and chloroform gave the following results:

Aqueous Solution	0.074	0.163
	0.274	0.436
$CHCl_3$ Solution	0.254	0.761
	0.185	5.43

What conclusions can be drawn from these results concerning the molecular condition of phenol in $CHCl_3$ solution?

3

RECOGNITION FORM

EXPERIMENTS AND GIVE EVIDENCE OF APPROPRIATE SCIENTIFIC METHOD

4. The students are able to become aware of various possible inferences that could be drawn from the experimental data.
5. The students are able to predict from the given data.

RECOGNITION FORM

A solution is known to contain one or more of the following cations and no others

Al***, Bi***, Cr***, Fe**, Hg**, Sn**, Zn**

Experiment I: Sodium hydroxide is added slowly. A precipitate forms and then part of it dissolves in excess NaOH. Filtration yields a clear colorless solution.

Experiment II: The residue from I is dissolved in acid; this solution is found to decolorize potassium permangenate solution.

Experiment III: The clear colorless filtrate from I is acidified, and then treated with excess ammonium hydroxide. A white precipitate remains and is filtered off. The precipitate is dissolved in acid and the resulting solution is found to decolorize potassium permangenate.

Experiment IV: The filtrate from the ammonium hydroxide treatment in III is found to form a white precipitate on saturation with hydrogen sulfide.

Using the information given, decide which ions are present or not present. For each item, *blacken* answer space.

A— if the ion is present.

B— if the ion is not present.

Objective 3

6. Account for the fact that (a) Zinc is deposited from an acid solution of Zinc Sulphate, and (b) Chlorine is liberated from a neutral chloride solution, upon electrolysis, although hydrogen and oxygen, respectively, might have been expected.

(*Continued*) RECOGNITION FORM

C— if the presence or absence of the ion cannot be determined on the basis of the information given.

1. Al^{***}
2. Bi^{***}
3. Cr^{***}
4. Fe^{**}
5. Hg^{**}
6. Sn^{**}
7. Zn^{**}

One or more of the following salts were used in preparing a sample for analysis:

$$AgNO_3,\ Al(NO_3)_3,\ BaCl_2,\ K_2CrO_4,\ MgSO_4,\ NaI,\ Pb(NO_3)_2$$

The sample dissolves completely in water to give an orange solution which turns a cloudy greenish brown on acidification with hydrochloric acid. This mixture is filtered. A portion of the clear filtrate is made strongly alkaline with sodium hydroxide solution. A white precipitate remains. Using the information given above, decide which salts were used in preparing the sample. For each item *blacken* answer space

A— if the salt was used.
B— if the salt was not used.
C— if the information given is not sufficient to decide.

8. $AgNO_3$
9. $Al(NO_3)_3$
10. $BaCl_2$
11. K_2CrO_4
12. $MgSO_4$
13. NaI
14. $Pb(NO_3)_2$

Sample 4. When PCl_5 is carried through the steps above the molecular weight calculated from the vapor density decreases as temperature increases, finally becoming constant at 104. The atomic weight of P is 31 and that of Cl is 35.5. The most reasonable explanation is that —

A— PCl_5 reacts with air at the higher temperatures to form a compound having a molecular weight of 104.

Objective 3

(Continued) RECOGNITION FORM

B– PCI_5 dissociates into PCI_3 and Cl_2 with increasing temperature.

C– PCI_5 molecules, molecular weight 208, split in two equal halves.

D– PCI_5 ionizes into P***** and 5CI.

E– The vapor of PCI_5 does not conform to the ideal gas laws.

OBJECTIVE

THE STUDENTS WILL DEVELOP THE ABILITY TO PRESENT IN A CLEAR AND

BEHAVIOUR

1. The students will be able to economise in the use of words without loss of precision.
2. The students will have knowledge of the historical aspects of the research.

Note: This objective can best be appraised by the open book type of testing. A written test in which the student may make use of text-books, periodicals, or other materials, the student may submit an essay report, or dissertation on a set topic given in advance or during the examination.

In the following questions, it is assumed that a student may make use of library services in answering the question.

ESSAY FORM

1. Trace the historical background leading to the enunciation of the (i) Law of mass action, (ii) Theory of ionization.
2. Give a critical historical survey of periodic classification.
3. Outline the development of the electronic theory of valency. How was the structure of benzene established?
4. Write an essay on Dalton's atomic theory and how it has enabled us to correlate the laws of chemical change.
5. Give an abstract of the Scientific material supplied to you.
6. Summarise the address delivered by scientist (x) to inaugurate your Chemistry Association.

AND INTERPRET CHEMISTRY RESEARCH AND FINDINGS MEANINGFUL FORM

3. The students will be able to present facts and events in proper sequence.
4. The students will be able to summarise a new report or topic in Chemistry.

RECOGNITION FORM

This section tests your ability to comprehend and analyze scientific writings. DIRECTIONS: Read the following passage carefully and then answer the questions that follow. Choose the *one* best answer in each item and *blacken* the corresponding space on your answer sheet.

PHOTOCHEMICAL PHENOMENA

The slowness of many reactions may be attributed to the large amount of energy required to activate the molecules. The necessary energy is rarely acquired through collision. Occasionally certain added substances, called catalysts, assist by facilitating reaction paths requiring less energy for activation. Although the reactions are different in such catalyzed reactions, the same final products are obtained as in the uncatalyzed reactions.

The molecules of some substances can be activated by absorption of radiation of the proper frequency. The collision of a photon (quantum of radiation) and a molecule may result among other things in dissociation, excitation, or ionization of the molecule. The energy of the incident photon is an important factor in the type of activation produced. The table below illustrates the type of activation produced by various wave lengths of radiation.

Objective 8

Wave length of radiation in Angstroms ($1A° = 10^{-8}$ *cm.*)	*Energy equivalent in calories per gram molecular wt.*	*Type of activation*
less than 2000 (ultraviolet and X-rays)	about 10^8	displacement of inner electrons
from 2000 to 4000 (ultraviolet)	142,000 max.	displacement of outer electrons
from 4000 to 8000 (visible)	71,000 max.	displacement of outer electrons
from 8000-200,000 (near infrared)	35,000 max.	increased vibration of atoms in molecule
more than 200,000 (far infrared)	1,400 max.	increased rotation of molecule

The average kinetic energy of random translational molecular motion is only a few hundred calories per mole (gram-molecular weight) at ordinary temperatures, while the energies of most chemical reactions lie in the range 20,000 to 100,000 calories per mole.

The absorption of visible or ultraviolet radiation is seen to result in activation by electron displacement. The resulting molecules (including in the term atoms and ions as well) may decompose, react with other molecules, or, if conditions are unfavourable, radiate the energy at a longer wave-length or lose it by collision.

The initial absorption of a quantum of energy by a molecule is termed the primary process; the corresponding value of 6.06×10^{23} quanta absorbed per mole is termed the "einstein". Although in the simplest case one mole of product will be formed for each einstein absorbed, usually these quantities are not equal. The efficiency of a photochemical reaction is expressed in terms of the yield per quantum; this is the ratio of moles of product to the number of einsteins absorbed.

Where the primary process is followed by a simple reaction, the quantum yield is nearly unity, as in the reaction $2HI \rightarrow H_2 + I_2$. The energy

(Continued) RECOGNITION FORM

in this case (for light of wave length 2800–3000 A°) is sufficient to dissociate HI into the atoms H and I. The quantum yield is the same whether the HI is gaseous, liquid, or in a hexane solution; changes in pressure are also without effect. Apparently the rate of formation of H_2 and I_2 is determined by the number of molecules of HI dissociated and not by the rate at which atoms of hydrogen and iodine combine to form molecules of hydrogen and iodine.

For some reactions the photochemical efficiency is extremely high. These reactions must involve secondary processes in which products of the reaction activate molecules of average energy; such a series is termed a chain reaction. The reaction $H_2 + Cl_2 \rightarrow 2HCl$ involves the sequence

$$Cl_2 + \text{photon (wave length } 4000A°) \rightarrow 2\ Cl$$
$$Cl + H_2 \rightarrow HCl + H$$
$$H + Cl_2 \rightarrow HCl + Cl, \text{ etc.}$$

A single quantum does not, of course, suffice for an infinite amount of product; the chain propagating atoms are removed by collision with the walls of the vessel or by combination with molecules of impurities, such as oxygen. The quantum yield is approximately 100,000 for this reaction.

The most important photochemical process is the union of carbon dioxide and water in green plants to form carbohydrates. Chlorophyll absorbes red and blue radiation in the primary process. An unsolved mystery is that the calculated energy requirement of 112,000 calories for carbohydrate formation corresponds to quanta of wave length 2300A°, a radiation practically absent from sunlight at the earth's surface. Perhaps three or more photons of red light (energy 40,000 calories) are able to combine their energy, a hitherto unknown occurrence.

A great step forward in our knowledge of life processes will have been taken when the mechanism of photosynthesis in plants has been elucidated.

1. For a temperature rise of 10°C, a typical photochemical reaction rate may be expected to

   A– double.

   B– triple.

   C– more than triple.

   D– increase very little.

   E– increase or decrease, depending on the mechanism involved.

Objective 8

2. Which of the following is the most plausible reason why a trace of impurity is sufficient to practically halt some chain reactions?

   A– The impurity raises the activation energy of the reaction to levels difficult to attain.

   B– The impurity absorbs all of the incident light.

   C– The impurity acts a negative catalyst or inhibitor.

   D– The impurity combines with the atoms carrying on the chain before they have participated to any great extent.

   E– The impurity acts as a catalyst in causing the activated molecules to collide with each other.

3. Which of the following is the *least* likely occurrence during the formation of HCl by the chain mechanism?

   A– The absorption of photons by molecules of gas.

   B– Collissions between molecules of H_2 and Cl_2.

   C– The collision of Cl atoms and H atoms to form HCl.

   D– The collision of Cl atoms and Cl_2 molecules.

   E– The collision of HCl molecules with either H_2 or Cl_2.

4. A beam of white light passes through chlorine. Upon emergence

   A– only the blue part of the spectrum will remain.

   B– some wave lengths will have disappeared or become weakened.

   C– its quanta will have become smaller in proportion to the energy absorbed by chlorine.

   D– its component colors will have shifted to lower wave lengths.

   E– it will have changed in intensity by the same amount at all wave lengths.

(Many additional questions were asked about this paper)

PHYSICS

OBJECTIVES

1. The student will acquire knowledge of the fundamental laws of various branches in Physics.
2. The student will develop the ability to apply the physical laws to explain various natural phenomena.
3. The student will develop the ability to apply basic principles in solving physical problems.
4. The student will develop manipulative skill in the laboratory procedures and in the use of instruments and precision measurements.
5. The student will realize the limitations of the validity of theory.
6. The student will acquire the ability to devise new experiments.
7. The student will be able to find and utilize reference material.
8. The student will be able to read and comprehend reports and literature on new developments in the subject.
9. The student will be able to follow and adjust to the impact of Physics on society and individuals.
10. The student will acquire the ability to improvise instruments for various purposes.

OBJECTIVE

THE STUDENT WILL ACQUIRE KNOWLEDGE OF THE

BEHAVIOUR

1. The student should know the basic principles.
2. The student is able to understand the inter-relation between the various principles.
3. The student is able to recognise and give illustrations of a principle.

ESSAY FORM

1. Discuss Newton's Law of Gravitation. Explain its relationship with other inverse square laws. In what way has the recent development of modern Physics affected the validity and limitations of the laws?

2. What will be the relation between the intensities of scattered light of wave lengths 2000 and 1000?

RECOGNITION FORM

FUNDAMENTAL LAWS OF VARIOUS BRANCHES IN PHYSICS

4. The student is able to solve numerical problems involving physical principles.
5. The student is able to analyse physical problems by dimensional methods.
6. The student knows the limitations of various theories and laws.

RECOGNITION FORM

—— G is a symbol for gravity
—— G is the force of gravity
—— G is the acceleration due to gravity
—— G is the greatest value of 'G'
—— G is the smallest value of acceleration due to gravity
—— G is the very small constant in the universal law of gravitation
—— G is a very large constant of gravitation
—— G is the dimension less constant connecting force of gravity, masses of two bodies and their distance apart
—— $G = 6.6 \times 10^{-8}$ $M^{-1}L^{3}T^{-2}$
—— $G = 6.6 \times 10^{8}$ C.G.S. units.

Mark the correct statements out of the above in connection with the universal law of gravitation.

2. Which are the most accurate and least accurate methods for determination of the mean density of the earth?

—— Inclined plane
—— Atwood's machine
—— Cavendish
—— Boys
—— Simple pendulum
—— Compound pendulum
——Calculate the value of acceleration due to gravity at the moon.

Objective 1

3. Which of the following statements are true?

—— Light of greater wave length is absorbed more than light of shorter wave length.
—— Light of shorter wave length is absorbed more than light of greater wave lengths.
—— The absorption of lights is the same for greater wave lengths as for shorter wave lengths.
—— Light is not absorbed as it comes from the sun.

4. Mark the correct statement:

The visible spectrum of the sun broadly speaking,

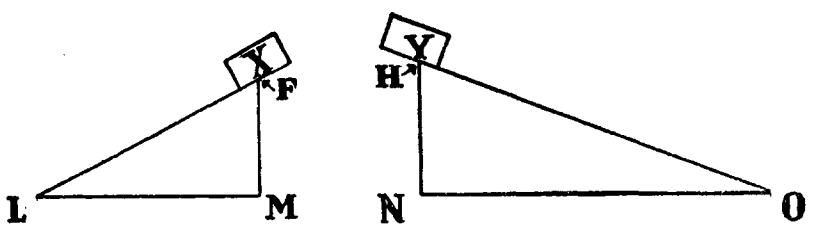
—— is continuous
—— has discrete lines
—— has band structure.

5. Which of the following statements is true?

—— Violet light has greater wave length and greater frequency than red.
—— Violet light has shorter wave length and shorter frequency than red.
—— Violet light has greater wave length and shorter frequency than red.
—— Violet light has shorter wave length and greater frequency than red.

DIRECTIONS: The numbers preceding the paired phrases in items 1-3 refer to the corresponding numbers on the answer sheet. Considering each pair from the standpoint of quantity, *blacken* answer space.

A— if the quantity at the left is greater than that at the right;
B— if the quantity at the left is smaller than that at the right;
C— if the two quantities are of essentially the same magnitude;
D — if the information given is insufficient for a comparison to be made.



Two identical blocks, X and Y, are placed on two inclined planes, as shown in the diagram. Neglect air resistance and other friction.

(*Continued*) RECOGNITION FORM

1. Kinetic energy of X on sliding to L-.... Kinetic energy of X on falling to M.
2. Work done on X in raising it from M to F.... Work done on Y in raising it from N to H.
3. Acceleration of X in sliding down incline towards L.... acceleration of Y in sliding down incline toward O.

DIRECTIONS: Mark each of the following statements:

A— if it is a correct statement about Newton's particle theory of light, but not about Huygens' pulse theory.

B— if it is a correct statement about Huygens' pulse theory of light, but not about Newton's particle theory.

C— if it is a correct statement about Newton's particle theory of light, and also about Huygens' pulse theory.

D— if it is an incorrect statement about Newton's particle theory of light, and also about Huygens' pulse theory.

1. Light must travel with a finite speed, if the theory is to be tenable.
2. Light always travels in straight lines, according to the theory.
3. The theory provides an explanation in mechanical terms of the cause of colour.
4. According to the theory, the refraction of light is *caused by* a change in the speed of light as it moves from one medium to another.
5. According to the theory, the speed of light is *greater* in an optically *denser* medium.
6. According to the theory, the ratio of the sines of incidence and refraction can be calculated, for two given media, if the speeds of light in the two media are known.
7. The theory can account without difficulty for the fact that a ray of light travels with uniform speed in a homogeneous medium, but only with difficulty for the fact that all rays of the same colour travel with the same speed.

OBJECTIVE

THE STUDENT WILL DEVELOP THE ABILITY TO NATURAL

BEHAVIOUR

1. The student carefully studies the phenomena.
2. The student locates the principles relevant to the phenomena.

ESSAY FORM

Explain why the colour of the setting sun is red.

2 RECOGNITION FORM

APPLY THE PHYSICAL LAWS TO EXPLAIN VARIOUS PHENOMENA

3. The student makes certain predictions.
4. The student offers explanations for the phenomena.
5. The student suspends judgment until he has verified his predictions.

RECOGNITION FORM

Sample 1.

1. Suppose an elevator is descending with a constant acceleration of gravity "g". If a passenger attempts to throw a rubber ball upward, what will be the motion of the ball with respect to the elevator? The ball will

   A— remain fixed at a point the passenger releases it.

   B— rise to the top of the elevator and remain there.

   C— not rise at all, but will fall to the floor.

   D— rise, bounce, then move toward the floor at a constant speed.

   E— rise, bounce, then move toward the floor at an increasing speed.

2. To an observer looking at a thin gold leaf it appears reddish; white objects viewed through the leaf appear green. This can be explained if we assume that the gold leaf

   A— reflects green and red.

   B— transmits green and red.

   C— transmits green and absorbs other colours.

   D— absorbs red and transmits other colours.

   E— reflects red and transmits other colours.

DIRECTIONS: For each statement of fact below, *blacken* the answer space corresponding to the one Explanatory principle, from the list preceding the statements, which is most directly useful in explaining the fact. If none of the principles listed is applicable, *blacken* answer space E.

Objective 2

(*Continued*) RECOGNITION FORM

NOTE THAT EACH ITEM REQUIRES ONE ANSWER ONLY

Explanatory Principles

A— Force is equal to mass times acceleration.

B— Friction exists between any two bodies in contact with each other.

C— Conservation of momentum.

D— Conservation of energy.

E— None of the foregoing.

3. A given door to be opened slowly requires a small force; to be opened quickly it requires a much greater force.

4. The velocity of a body moving along a curve cannot be constant.

5. A brick can be pulled along a fairly smooth surface by means of a string; the string would break, however, if jerked sharply.

OBJECTIVE

THE STUDENT WILL DEVELOP MANIPULATIVE SKILL IN INSTRUMENTS AND

BEHAVIOUR

1. The student is able to recognize the purpose for which a given instrument can be used.
2. The student is able (with the help of simple diagrams) to align various components of an instrument.
3. The student is able to set the different component parts of an instrument.

ESSAY FORM

1. (a) Determine the wave length of green line of mercury with a Michelson Interferometer; obtain also the Fringe Pattern of White light.
   (b) Give a neat sketch of the complete experimental arrangement explaining clearly how the interference is brought about.
   (c) Derive the necessary formula you use from the wave theory of light.
   (d) What is the order of magnitude of relative distances of the two mirrors from the centre optical system in order that the fringe may be obtained (a) for mercury given light or (b) for white light. Explain the significance of the additional glass plates in the system. Can the glass plates be substituted by similar quartz plates or flourite plates?
   (e) Explain with necessary diagrams how proper alignments of the mirrors can produce (i) circular fringes (ii) hyperbolic fringes.
   (f) What is the accuracy with which the wave length has been determined? With the accuracy obtained can you determine the wavelengths of the D_1 and D_2 lines of sodium separately?
   (g) Indicate some other experiments by which the wave length of the green can be determined more accurately.
2. (a) You are given a sketch of the experimental arrangement of the Michelson Interferometer for the determination of the wave of the

4 RECOGNITION FORM

THE LABORATORY PROCEDURES AND IN THE USE OF PRECISION MEASUREMENTS

4. The student is able to determine the order of accuracy of a particular instrument.
5. The student is able to suggest alterations, and improvements in the experimental set-up, to improve the accuracy.
6. The student is able to think of alternative experimental arrangements (apart from conventional ones) to carry out a certain measurement.
7. The student is able to record his observations properly.

RECOGNITION FORM

DIRECTIONS: In the blank before each item, put the number corresponding to the *one* apparatus commonly used for making the required measurement. If the proper apparatus is not in the list, put O in the blank.

	Apparatus (in alphabetical order)
—— to detect the presence of a certain element in a star	0. None of the apparatus below
—— to measure the temperature of molten gold	1. Aneroid
—— to measure humidity of air	2. Bourdon spring gage
—— to measure atmospheric pressure	3. Cavendish apparatus
—— to measure electron velocity	4. Diffraction grating
—— to detect the presence of isotopes	5. Electrophorus
—— to measure pressures of about .1 mm. of Hg.	6. Electrostatic voltmeter
	7. Hydrogen thermometer
	8. Hygrometer
	9. Interferometer
	10. Kundt's tube
	11. Mass spectrograph
	12. McLeod Gage

Objective 4

given line of mercury. The sketch contains some errors in the optical plate given as in other parts. Make the necessary corrections.

(b) Will you be able to observe the fringes with the help of a microscope in place of the telescope ?

(*Continued*) RECOGNITION FORM

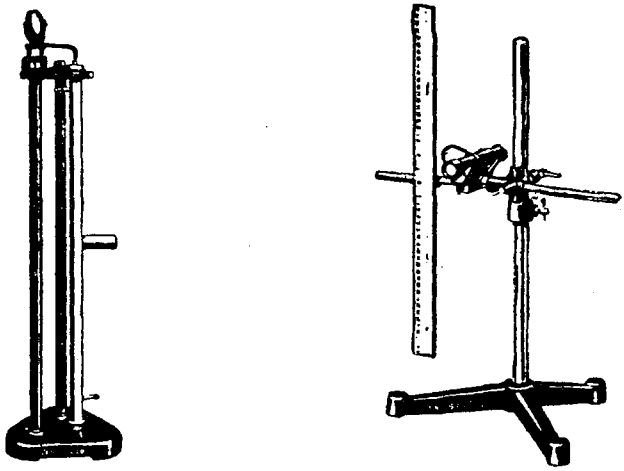
—— to measure pressure of steam in a boiler

—— to measure velocity of sound in metal

—— to measure lengths with the accuracy of 10^{-5} cm.

13. Micrometer
14. Nicol's Prism
15. Pyrometer
16. Simple pendulum
17. Voltmeter (permanent magnet type)
18. Wheatstone bridge

The equipment shown in the diagram below is used for the measurement of the coefficient of linear expansion of two rods of different material.



(If you are in doubt about the setup, you may go to the front of the room where there are two setups of the experiment. There should be only one student at a time at each apparatus. Do not disturb your fellow students !)

In the column at the left is given a fairly detailed "laboratory report".

Some of the sentences of the report are numbered. On the right-hand side of the page there is a series of comments or criticisms numbered the same as the sentence to which it applies. Choose the most appropriate comment and write its letter in the blank. Sentences in the report which are not numbered are to be taken as correct.

The brass rod of which the coefficient of expansion is to be measured is inserted through the

— 1. (A) This procedure is correct.
(B) The telescope should be focused for a distance

Objective 4

corks at the top and bottom of the heating jacket tube. At the bottom there is a piece of glass rod on which the brass rod is resting. The mirror is set with two legs on the frame of the apparatus and with the third leg resting on the end of the rod.

(1) The telescope is focused until a distinct image of the mirror is seen.

(2) The apparatus and mirror is then turned so that the image of the scale is in the line of sight of the telescope.

(3) Tap water is then entered through the upper connection on the jacket and the lower pipe is connected to the sink.
When the thermometer reading becomes constant the scale reading is recorded.
The steam is then sent through the system in the same way.
The scale reading is recorded again as soon as there is steam emerging from the lower outlet.
From the data and the equation $l_2 = l_1 [1 + \alpha (t_2 - t_1)]$ the coefficients of linear expansion are found to be

(4) $\alpha_1 = 16.2 \times 10^{-6}$ cm°C
$\alpha_2 = -1.5 \times 10^{-6}$ cm°C

(5) In determining the change in length use has been made of the fact that the difference of the scale readings divided by the distance of the scale from the mirror (telescope to mirror) + (mirror to telescope).

(C) The telescope should be focused for a distance (telescope to mirror) + (mirror to scale).

(D) The telescope should be focused for a distance equal to the distance of (mirror-scale) divided by the magnification of the telescope.

– 2. (A) The telescope should have been adjusted for parallax-free observation before it has been focused.

(B) The adjustment for parallax-free observation is automatically achieved by bringing the image into focus.

(C) The adjustment for parallax-free observation is achieved by having the cross-hair and image simultaneously in focus.

(D) No adjustment is necessary since only difference of readings will be used in this experiment.

– 3. (A) This procedure is correct.

(B) If the water were connected to the lower opening one would be more sure that the water actually cooled the rod.

(C) It would be just as well to connect the water to the lower opening.

(Continued) RECOGNITION FORM

equals the angle through which the mirror turns.

(6) This angle will also be equal to the ratio of the elongation of the rod to the distance of the third leg of the mirror from the line joining the two other legs.
Discussion of results and possible errors: the first rod was labeled "brass". The values given in the Handbook of Chemistry and Physics vary for the different kinds of brass between 16.9×10^{-6} and 19.3×10^{-6}.

(7) The minimum per cent error is 4.14%.
The maximum per cent error is 16%.

(8) The errors in this experiment are expected to be large mainly because the length of the rod had been measured only with the meter-stick.

—4. (A) These units are correct.
(B) The units should be $°C^{-1}$.
(C) α is dimensionless so that there should be no units.

—5. (A) This statement is generally correct.
(B) This statement is correct since only small angles are involved.
(C) The statement is incorrect; it should read that the ratio equals 1/2 the angle through which the mirror turns since only small angles are involved.
(D) The statement is incorrect; it should read that the ratio equals twice the angle through which the mirror turns since only small angles are involved.

—6. (A) This statement is generally correct.
(B) This statement is only true because of the fact that $\tan \theta \cong \theta$ for small angles.
(C) This statement is only true because of the fact that $\sin \theta \cong \theta$ for small angles.

—7. (A) The value is right but the number of significant figures is wrong.
(B) Both the value and the number of significant figures are correct.

Objective 4

(Continued) RECOGNITION FORM

(C) The value is wrong but the number of significant figures is correct.

(D) Both the value and the number of significant figures are wrong.

– 8. (A) This is a correct statement, for, since the change of length of the rod enters into the calculation, the length has to be determined with great care.

(B) The actual length of the rod does not enter into the calculation, so that this measurement does not introduce any error.

(C) The change of length is being determined without making use of the actual length so that this measurement does not need to be more accurate than the other measurements.

OBJECTIVE

THE STUDENT WILL ACQUIRE THE ABILITY

BEHAVIOUR

1. The student is able to determine the order of the magnitude of the quantities involved.
2. The student is able to select and organize the instruments or apparatus which is relevant.
3. The student is able to determine the level of precision and particular characteristics of the apparatus.

ESSAY FORM

Note: This objective is best appraised by observing the student attack a new problem in the laboratory or by reading his report on an experiment or problem he has attempted to solve.

6 RECOGNITION FORM

TO DEVISE NEW EXPERIMENTS

4. The student is able to detect the possible sources of error in the experiment.
5. The student is able to determine the level of precision and accuracy of the experimental results involved.
6. The student is able to determine the best approximation of the ideal experiment under the conditions existing in the laboratory.

RECOGNITION FORM

1. Light has wave characteristics. Which of the following is the best experimental evidence for this statement?

   A— Light can be reflected by a mirror.
   B— Light forms dark and light bands on passing through a small opening.
   C— A beam of white light can be broken into its component colours by a prism.
   D— Light operates a photoelectric cell.
   E— Light carries energy.

2. A beam of white light passes through a glass prism and is dispersed. The best explanation of this order of dispersion is

   A— the prism alters the frequency of blue light more than that of red light.
   B— white light is composed of three primary colours.
   C— the amount of deviation varies with the type of glass used for the prism.
   D— red light moves more rapidly through glass than do the other components of white light.
   E— diffraction causes the beam to spread out.

3. The mass of an atom is concentrated in a very small part of the total volume of the atom. Which of the following is the best experimental evidence for this statement?

Objective 6

(*Continued*) RECOGNITION FORM

A— Gases can be compressed into very small volumes.

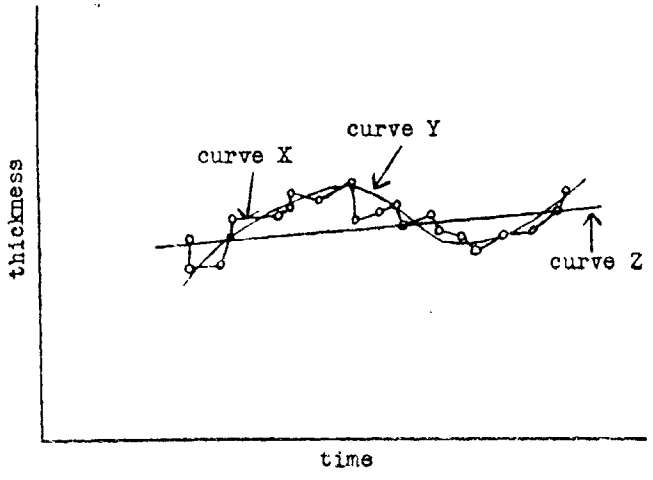
B— Gases diffuse through one another.

C— Some substances are transparent.

D— There is no loss or gain in mass during a chemical reaction.

E— Alpha particles penetrate thin sheets of gold with little deviation for the most part.

DIRECTIONS: An investigation is made of the relationship between the thickness of silver deposited in a photographic film and the time of exposure. The small circles represent the data obtained in several experiments. Three curves, X, Y, and Z, are drawn in an attempt to clarify the relationship. Compare the curves as to their representation of the data, and *blacken* the answer space corresponding to the *one best* completion of each statement.



urve X is

A— satisfactory, because it passes through all of the points.

B— satisfactory, because it shows that there is a value of thickness corresponding to each interval of time.

Objective 6

C— unsatisfactory, because it does not extend far enough beyond the first and last points.

D— unsatisfactory, because its deviations from a smooth curve are probably due to experimental error.

E— unsatisfactory, because the relationship must be linear.

Curve Y is

A— satisfactory, because it represents the general trend of the data points.

B— satisfactory, because there are as many points on one side of it as on the other.

C— unsatisfactory, because it misses so many of the points.

D— unsatisfactory, because it extends beyond the first and last data points.

E— unsatisfactory, because no relationship between thickness and time could involve such a complex curve.

BOTANY

OBJECTIVES

1. The student should have a knowledge of the basic facts, concepts and methods.
2. The student should be able to apply the principles of botany to new problems.
3. The student should develop skill in accurate observation and recording of botanical phenomena.
4. The student should develop the ability to use instruments and techniques for botanical observation and research.
5. The student should be able to analyse new botanical data and to discern the major relationships in the given date.
6. The student should develop skill in describing phenomena and in reporting the results of observation and research.
7. The student should develop the ability to study and comprehend new developments in the field.
8. The student should develop an interest in field work.
9. The student should become aware of the limitations in the applicability of botany.

OBJECTIVE

THE STUDENT SHOULD HAVE A KNOWLEDGE OF

BEHAVIOUR

The student should be able to

1. identify and describe the plants in proper terms.
2. differentiate plants with regard to environmental features and other characteristics.
3. relate the methods of reproduction in plants to their characteristics.

ESSAY FORM

a. Make a list of the flowering plants in an area, noting their habitat and make a report on their flowering.

b. You are given certain flowers; make a report on their placentation. Note the abnormalities if any.

c. How would you proceed to make microscopic preparations of the spores of the Riccia species.

d. Describe the internal structure of the leaf. Point out the distribution of Sclerenchyma therein. Explain the staining methods used.

1 RECOGNITION FORM

THE BASIC FACTS, CONCEPTS AND METHODS

4. classify the plants and describe their evolutionary sequence in time and space.
5. determine the utility of different plant life.

RECOGNITION FORM

DIRECTIONS: For each of the following statements, *blacken* answer space

A– if the statement is consistent with the *Darwinian* conception of evolution, but not with the *Lamarckian* conception of evolution or the hypothesis of *special creation*;

B– if the statement is consistent with both the *Darwinian* and *Lamarckian* evolutionary conceptions, but *not* with the hypothesis of *special creation*.

C– if the statement is consistent with the *Darwinian* conception and *special creation* hypothesis, but not with the *Lamarckian*.

D– if the statement is consist with *all three* conceptions.

E– if the statement is inconsistent with the *Darwinian* conception.

1. Trees growing along the Pacific coast often bend inland away from the wind, whether grown there from seed or planted there as small trees.
2. The descendants of the trees in item 1, which have been grown for many generations in this windy place, if reared in a calm site grow as erect as trees native to that calm site.
3. Throughout the world, the plants and animals characteristic of tropical regions are very different from those of temperate regions.
4. In both plant and animal kingdoms, offspring tend to resemble their parents.
5. It is impossible to improve the commercial value of domestic plants and animals by breeding.

Objective 1

DIRECTIONS: The following paired statements refer to structures, functions, or factors which are to be compared in the quantitative sense. *Blacken* answer space

A— if the thing described on the left *is greater than* that on the right;

B— if the thing described on the left *is less than* that on the right;

C— if the left and the right are *essentially the same.*

6. The humidity of the *poplar* stage in dune succession	the humidity of the *beech* and *maple* stage in dune succession.
7. Probability of establishment of a coral reef in the sea *one mile* from the mouth of the Amazon River	probability of establishment of a coral reef in the sea *100 miles* from the mouth of the Amazon River.
8. Total weight of all *parasites* on earth	total weight of all *hosts* on earth.
9. Maximum size of food particle that can be eaten by a *sponge*	maximum size of food particle that can be eaten by a *coelenterate.*
10. Average size of wood cells produced during *summer*	average size of wood cells produced during *spring.*
11. Effectiveness of *spores* as agents for distribution of a plant species	effectiveness of *gametes* as agents for distribution of a plant species.
12. Number of annual rings at *base of the trunk* of an old tree	number of annual rings at a point *half-way up the trunk* of the same tree.

(Continued) RECOGNITION FORM

A biological situation is listed below. In each situation, a *specific phenomenon* is *underlined.* After each situation is a numbered list of statements, each of which may or may not be directly related to the specific phenomenon.

DIRECTIONS: For each numbered statement *blacken* the answer space, in accordance with the series of choices given below, which best characterizes the statement.

Blacken answer space

A— if the statement helps to *explain* the cause of the phenomenon;

B— if it *merely describes* the phenomenon;

C— if it describes a *consequence* of the phenomenon;

D— if the statement is *true,* but does not directly relate to the phenomenon;

E— if the statement is *false.*

A flower box is kept near a south window. All the plants in the box *bend toward the window.*

13. The plants were exposed to unequal illumination on opposite sides.
14. Growth rates differ on the exposed and shaded portions of the stems.
15. Cell division proceeds at a greater rate on the shaded side.
16. The rate of photosynthesis is greater on the exposed side.
17. The plants receive an increased illumination due to the bending.
18. The plants exhibit positive phototropism.
19. Within certain limits, cell elongation is directly proportional to the quantity of active auxin present.

OBJECTIVE

THE STUDENT SHOULD BE ABLE TO APPLY THE

BEHAVIOUR

The student can

1. determine what the problem requires by reformulating it in his own words.
2. determine which of several principles is relevant to the given problem.

ESSAY FORM

1. In a given tree the apex of the main shoot is withered. How will you determine the cause of this?
2. How does Dixon explain the ascent of sap in plants? Under what limiting conditions is this view sound?
3. What similarities and differences would you find in the rise of water in glass tubes in contrast to the rise of sap in plant vessels.
4. If a crop fails in a given year, on what basis can you determine whether a particular cause is responsible?

2. RECOGNITION FORM

PRINCIPLES OF BOTANY TO NEW PROBLEMS

3. explain why an event has occurred in the light of the appropriate principle.
4. predict what will happen in a given set of circumstances or conditions.
5. determine the limits of the applicability of a given principle.

RECOGNITION FORM

Two hypotheses have been advanced to account for sex-determination in those animals and plants in which normal females are AAXX and normal males are AAXY. (A stands for a full "set" of autosomes, such as is carried in a normal gamete.)

Hypothesis A: The sex-influencing genes are on the X-chromosomes and autosomes only. Those genes on X influence towards femaleness. Those on autosomes influence towards maleness. In other words, sex depends upon the ratio between X-chromosomes and autosomes.

Hypothesis B: The sex-influencing genes are on the X- and Y-chromosomes only. Those genes on X influence towards femaleness. Those on Y influence towards maleness.

In attempting to determine which hypothesis was probably correct for different species of plants and animals, various combinations of autosomes and X- and Y-chromosomes were brought together in zygotes, and the sex of the resulting individual determined. Below is given a series of chromosome combinations together with the sexes to which the individuals might conceivably belong.

DIRECTIONS: For each numbered item, *blacken* answer space

A—if the sex designated would be expected or admissable under Hypothesis A *only*.

B—if the sex designated would be expected or admissable under Hypothesis B *only*.

Objective 2

C— if the sex designated would be expected *or* admissable under *both* hypotheses.

D— if the sex designated would be expected or admissable under *neither* hypotheses.

(Note : Superfemales are to be regarded as females; supermales are to be regarded as males. It would be advisable to work out a full set of notes before proceeding to answer the items in this part.

1.	AAXXX	male	16.	AAX	male
2.	AAXXX	female	17.	AAX	female
3.	AAXXX	intersex	18.	AAX	intersex
4.	AAXXY	male	19.	AAXYY	male
5.	AAXXY	female	20.	AAXYY	female
6.	AAXXY	intersex	21.	AAXYY	intersex
7.	AAAXX	male	22.	AAAAXX	male
8.	AAAXX	female	23.	AAAAXX	female
9.	AAAXX	intersex	24.	AAAAXX	intersex
10.	AAAXXY	male	25.	AAAX	male
11.	AAAXXY	female	26.	AAAX	female
12.	AAAXXY	intersex	27.	AAAX	intersex
13.	AAAAXXX	male			
14.	AAAAXXX	female			
15.	AAAAXXX	intersex			

DIRECTIONS: For each numbered statement below, *blacken* answer space

A— if the statement is *true;*

B— if the statement is *false.*

A narcissus bulb fitted into the neck of a clear-glass tumbler and thus suspended above a water surface, is allowed to sprout near an east window in an otherwise dark but warm basement room.

(Continued) RECOGNITION FORM

1. Some of the auxin in the stem will be inactivated.
2. The stem would grow taller if it were in complete darkness.
3. Since roots are negatively phototropic, they will not respond to the light coming through the window.
4. The rate of cell division will be greater on the east side than on the west side of the stem.
5. In an average 24-hour period during the sprouting of the bulb, the plant will take in more carbon dioxide than it gives off.
6. In both stem and roots, the rate of elongation will be greater on the west side than on the east side.

OBJECTIVE

THE STUDENT SHOULD DEVELOP SKILL IN BOTANICAL

BEHAVIOUR

The student should :

1. be familiar with different kinds of observation and techniques appropriate to them.

2. be able to draw independent conclusions uninfluenced by those of others.

ESSAY FORM

1. How does an ecological observation differ from that of an anatomical observation ?

2. How many plants as a minimum would you observe in the F 2 population of a cross made between two varieties with the object of determining the monohybrid or dihybrid ratio as the case may be.

3. Assuming you are well acquainted with the characteristic features of root and stem—classify the following morphologically giving reasons :
   1) beet root; 2) potato; 3) sweet potato; 4) suran; 5) ginger.

4. You have to assess the effects of NPK on two varieties of wheat. What layout would you adopt and why ? State the minimum size of the plots and subplots. In the selection of site would you select a slopy land ? Would you object to the presence of a tree in it ?

3 RECOGNITION FORM

ACCURATE OBSERVATION AND RECORDING OF PHENOMENA

3. observe a sufficient number of objects or phenomena before he arrives at a conclusion.
4. know the correct use of instruments.
5. be familiar with the use of graphs, other record sheets and field techniques.

RECOGNITION FORM

When snap-dragons are grown on a normal nutrient solution their descendants show, on the average, 5 new mutations per 1,000 plants.

When snap-dragons are grown on a nutrient solution that lacks nitrogen or phosphorus or sulphur (but is otherwise normal) their descendants show, on the average, 25 new mutations per 1,000 plants.

When snap-dragons are grown on a normal nutrient solution for a while, then grown on distilled water (which tends to starve the plants) some of them succeed in producing flowers and seeds. The descendants derived from such seeds show, on the average, 5 new mutations per 1,000 plants.

When snap-dragons are subjected to a standardized treatment with X-rays, their descendants show, on the average, 25 new mutations per 1,000 plants.

When snap-dragons are grown on a nutrient solution that lacks nitrogen or phosphorus or sulphur (but is otherwise normal) and are also subjected to a standardized treatment with X-rays, their descendants show, on the average, 45 new mutations per 1,000 plants.

DIRECTIONS: For each of the following items, *blacken* answer space

A— if the statement is *warranted* by the data presented above;

B— if the statement is *contradicted* by the data;

C— if the statement goes *beyond* the data presented.

Objective 3

(Continued) RECOGNITION FORM

1. Starvation is the complete cause of the induction of mutation in the snap-dragon.
2. Starvation is a sufficient cause of the induction of mutation in the snap-dragon.
3. Starvation is a sufficient cause of the acceleration of mutation rate in the snap-dragon.
4. The absence of some single element is the complete cause of the induction of mutation in the snap-dragon.
5. It is possible to induce as many mutations by withholding certain single elements as by treating the plants with X-rays.
6. The absence of some single element is a sufficient cause of the acceleration of mutation rate in the snap-dragon.
7. X-raying is the complete cause of the induction of mutation in the snap-dragon.
8. It would be possible to induce over 50 mutations per 1,000 plants by withholding nitrogen, phosphorous and sulphur.
9. X-raying is a sufficient cause of the acceleration of mutation rate in the snap-dragon.
10. In their effect upon mutation in the snap-dragon, the absence of single elements and X-raying interact like complementary factors.
11. In their effect upon mutation in the snap-dragon, the absence of single elements and X-raying interact like inhibitory factors.
12. In their effect upon mutation in the snap-dragon, the absence of single elements and X-raying interact like cumulative factors.
13. The mode of action of X-rays in the gence is the same as the mode of action produced by withholding certain single elements.

OBJECTIVE

THE STUDENT SHOULD DEVELOP THE ABILITY BOTANICAL OBSERVATION

BEHAVIOURS

The student should

1. be able to handle the microscope and be familiar with reasons for each procedure.
2. be familiar with the normal instruments used in Anatomy, Physiology, Ecology, etc. and when necessary, should be able to modify them and design his own.
3. know limitations in the use of various instruments and techniques.

ESSAY FORM

1. What is the maximum magnification that you can obtain with the microscope provided (object, x 20, x 40, x 100 oil immersion eyepiece, x 5, x 10, x 15). What limits the maximum magnification of an optical microscope?
2. Name any six common chemical reagents used in plant anatomical work and fully explain the action of each on plant tissues.
3. In making permanent botanical slides, you often find them "Cloudy". Explain the reasons for the cloudiness and discuss methods of preventing it.
4. Show a slide and a photomicrograph. Ask student to calculate scale of magnification of photograph.
5. Give a piece of unfamiliar wood and ask student to (a) give a complete report on the anatomy of the specimen; (b) show stained preparations showing various details; (c) make a composite sketch showing the relation of the various parts.
6. Give an unstained slide of either bacteria or fungal spores or algal reproductive bodies and ask for a report on structure etc. without use of stains.
7. Give a piece of *sterculia uvens* stem or *Ficus bengalenois* or any plant with latex or muciloze etc. and ask for a complete report and finished slides to prove the report's points.

4 RECOGNITION FORM

TO USE INSTRUMENTS AND TECHNIQUES FOR AND RESEARCH

4. be able to determine the technique and/or instruments to be used in a new problem.
5. be able to use proper economy in the handling of instruments and chemicals.
6. be skillful in performing some of the more precise techniques such as staining, microphotography, etc.

RECOGNITION FORM

This objection can be best evaluated by placing a student in a laboratory situation. The recognition form of question is not very useful here.

OBJECTIVE

THE STUDENT SHOULD DEVELOP SKILL IN RESULTS OF OBSERVATION

BEHAVIOUR

The student should be able to

1. describe a given specimen accurately.
2. differentiate major characteristics of several specimen.

ESSAY FORM

1. Describe the nature of shoe-flower.
2. Distinguish between i) Rose and Shoe-flower; ii) Karana and Canna.
3. In a breeding experiment a cross between two parents resulted in a progreny in the ratio of 3 : 1 explain.
4. What are major differentiating characteristics of rose and shoe-flower ?
5. Which of the several hypotheses for the ascent of sap in plants is acceptable to you and why ?

6 RECOGNITION FORM

DESCRIBING PHENOMENA AND IN REPORTING THE AND RESEARCH

3. discriminate relevant from irrelevant data for a given problem.
4. state an hypothesis in clear terms.
5. reconcile apparently contradictory data.

RECOGNITION FORM

1. Match the following :

a.	i) Rose	a.	Epipetalous Stamens
	ii) Shoe-flower	b.	Monadelphous Androecium
	iii) Karana	c.	Staminodes
	iv) Canna	d.	Indefinite petals.

2. Which of the following best differentiate Rose from Shoe-flower.
   1) Staminodes are present or absent.
   2) Stamens are free or united.
   3) Androphore or Gynophore is present.
3. In Part I are stated some hypotheses and in Part II are given some statements of specific data. Put A or B or C against the statement explained by it.

Part I.

A. Independent unit characters.

B. Dominance.

C. Purity of Gametes.

Part II.

i) Only one of the two contrasting characters is present in a sexual cell.

ii) A heriditary determiner has its own existence.

(Continued)

iii) Both of the two contrasting characters present in two parents that are crossed do not appear in their first progeny.

14. Mark each of the following statements

A if it is applicable to Rose.

B if it is applicable to Shoe-flower.

– Has medicinal use.
– Does not have prickles.
– Has fragrance.
– Colour can be produced.
– Propagated by cuttings.
– Perfume can be prepared.
– Gum is produced.

15. State against the following a hypothesis which explains them. The sap is carried upwards in a plant because of

i) Working of living cells.
ii) The evaporative pool.
iii) The capacity of absorption of water by walls.
iv) The rise of water in tubes of small bore.
v) Air maintains a column of liquid in a tube.
vi) The creation of pressure in the subsoil region of a plant.

16. For the study of Rose. Which of the following data are relevant and which irrelevant.

i) Water-Plant. ii) Land-Plant.
iii) Climbing-Plant. iv) Simple leaves.
v) Unisexual. vi) Bi-sexual.
vii) Petals-definite and indefinite. viii) Usefulness.

MATHEMATICS

OBJECTIVES

1. The student will acquire knowledge of definitions, concepts, and theories in mathematics.
2. The student will develop the ability to solve problems on the basis of the theories and methods learned.
3. The student will develop the ability to think in terms of postulations and logical structure.
4. The student will acquire the ability to solve problems by combining different branches of mathematics.
5. The student will become aware of the inter-relations between mathematics and other branches of knowledge.
6. The student will develop skill in applying mathematical methods to the solution of problems in other fields of knowledge.
7. The student will develop the ability to impart mathematical knowledge to others.

OBJECTIVE

THE STUDENTS WILL ACQUIRE KNOWLEDGE OF

BEHAVIOUR

The student should

a. be able to state the theories and demonstrate them.

b. be able to work out the immediate implications of the theories.

c. be able to deduce a result from a given set of conditions.

ESSAY FORM

1. State and prove Rolle's theorem.

2. Find c so that –

   $f'(c) = f(b) - f(a)/b-a$

   where $f(x) = e^x$ and $a = 0, \quad b = 1$.

3. Two systems of rectangular axes have the same origin. If a plane cuts them at distances a, b, c and a′, b′, c′ from the origin, prove that

   $$1/a^2 + 1/b^2 + 1/c^2 = 1/a'^2 + 1/b'^2 + 1/c'^2.$$

4. Find the limit of

   $$\frac{(1+x)^{1/x} - e}{x}$$ as x tends to zero.

5. Put the following in an analytical form:–

   If a curve has a tangent at all points of its length, here corresponds for every chord AB a point P such that the tangent at P is parallel to AB.

6. "What are the uniform and ordered movements by the assumption of which the apparent motions of the movements of planets can be accounted for?"—Plato

   Trace the answer to the above question to the time of Newton.

1 RECOGNITION FORM

DEFINITIONS, CONCEPTS AND THEORIES IN MATHEMATICS

d. be able to recognise the appropriate form for specified problems and the techniques of solving them.
e. be able to recognise and express a mathematical theorem in different forms.
f. know the history of mathematical thought including Sumerian, Babylonian, Hindu, Chinese, Egyptian, and Greek contributions to mathematics and their inter-influences.

RECOGNITION FORM

DIRECTIONS: The following functional relations define y as a function of x. If the range of y is to be restricted to real numbers, find the domain of definition of the function in each case and *blacken* the corresponding answer space.

1. $y = \dfrac{x^2}{\sqrt{x^2 - 4}}$

(A) $-2 < x < 2$
(B) $-2 \leqq x \leqq 2$
(C) $x < -4$ or $x > 4$
(D) $x < -2$ or $x > 2$
(E) $x \leqq -2$ or $x \geqq 2$

2. $y = \sqrt{\dfrac{x-5}{x+2}}$

(A) $x < -2$ or $x > 5$
(B) $x \leqq -2$ or $x \geqq 5$
(C) $x < -2$ or $x \geqq 5$
(D) $-2 < x \leqq 5$
(E) $-2 \leqq x \leqq 5$

Let a and b be real numbers. For each choice of a and b the equation $y = x^2 + ax + b$ corresponds to a curve. For example, if $a = 3$ and $b = 2$, the equation is $y = x^2 + 3x + 2$; if $a = -1$ and $b = 2$, the equation is $y = x^2 - x - 2$. If a and b are unspecified, the equation corresponds to a *set* of curves, different curves of the set being obtained by different choices of a and b.

Objective 2

DIRECTIONS: Each of items 3-5 refers to the set of curves corresponding to the equation $y = x^2 + ax + b$ as discussed above. You are to complete in each case a statement about this set of curves.

3. A curve of the set will pass through the origin if
   (A) $a = 0$
   (B) $b = 0$
   (C) $a = b$
   (D) $a = 2b$
   (E) None of the foregoing.

4. A curve of the set will have no point in common with the x-axis if
   (A) $a^2 - 4b < 0$
   (B) $a^2 - 4b > 0$
   (C) $a^2 = 4b$
   (D) $a = 0$
   (E) None of the foregoing.

5. A curve of the set will have *just one* point in common with the x-axis if
   (A) $a^2 - 4b < 0$
   (B) $a^2 - 4b > 0$
   (C) $a^2 = 4b$
   (D) $b = 0$
   (E) None of the foregoing.

In items 1 to 10 we shall use the symbols $\blacksquare$, $\blacksquare^2$, and n with the following meanings:

For any positive real numbers a and b,

$$a \blacksquare b = \frac{a}{a + b}$$

$$a \blacksquare^2 b = (a \blacksquare b) \blacksquare (a \blacksquare b)$$

$$a \; n \; b = \frac{ab}{1 - a^n}, \text{ where n is a natural number.}$$

All other mathematical symbols have their usual meanings, and a and b throughout are positive real numbers.

DIRECTIONS: Choose the correct answer among the alternatives given and *blacken* the corresponding answer space.

(*Continued*) RECOGNITION FORM

Solve for x:

1. $a = x \mid b$
2. $b = a \mid x$
3. $a = x \quad 2 \quad b$
4. $x \mid b = x \quad 1 \quad b$, where $x = 0$

(A) $x = \dfrac{a(1-b)}{b}$

(B) $x = 1 - b$

(C) $x = \dfrac{ab}{1-a}$

(D) $x = \dfrac{a}{a+b}$

(E) None of the foregoing.

5. $a \mid^2 b$ equals
6. $(a \mid b) \quad 1 \quad (a \mid b)$ equals
7. $a \quad 2 \quad b$ equals

(A) $\dfrac{a^2}{b(a+b)}$

(B) $\frac{1}{2}$

(C) 1

(D) $\dfrac{ab}{1-a^2}$

(E) None of the foregoing.

8. The operation $\mid$ applied to the positive real numbers satisfies the commutative postulate.
9. The operation 2 applied to the positive real numbers satisfies the associative postulate.
10. The class of all positive real numbers is closed with respect to the operation $\mid$.

(A) True
(B) False
(C) Undetermined

OBJECTIVE

THE STUDENT WILL DEVELOP THE ABILITY TO SOLVE METHODS

BEHAVIOUR

The student should :

a. be able to translate a problem into the appropriate mathematical form.

b. be able to select and apply relevant theories to the problem.

ESSAY FORM

1. If a, b, c, are positive, and $a + b + c = 1$, prove that $(1/a - 1)\ (1/b - 1)\ (1/c - 1) = 8$

2. Find the limit of the series :

$$\frac{\sqrt{n}}{(3 + 4\sqrt{n})^2} + \frac{\sqrt{n}}{\sqrt{2}(3\sqrt{2} + 4\sqrt{n})^2} + \frac{\sqrt{n}}{3\sqrt{3}(3\sqrt{3} + 4\sqrt{n})^2}$$

as n tends to infinity.

3. Construct a function which takes all values between 0 and 1 in the interval (0,1) but is not continuous in the interval.

4. Find a point within a triangle such that the sum of its distances from the angular points of a triangle is minimum.

2 RECOGNITION FORM

PROBLEMS ON THE BASIS OF THE THEORIES AND LEARNED

c. be able to verify whether a solution conforms to specified conditions.

RECOGNITION FORM

1. If the lengths of the legs of a right triangle PQR are a and b, and if the length of the longest side of the triangle formed by the midpoints of the sides of triangle PQR is x, then an equation satisfied by x is

(A) $x = \frac{a + b}{2}$

(B) $x^2 = \frac{a^2 + b^2}{2}$

(C) $x^2 = \frac{a^2 + b^2}{4}$

(D) $2x = \sqrt{a} + \sqrt{b}$

(E) $2x = \sqrt{a + b}$

OBJECTIVE:

THE STUDENT WILL DEVELOP THE ABILITY TO THINK IN

BEHAVIOUR

The student should be able :

a) to deduce simple logical consequences out of a given set of postulates..

b) to recognise obvious gaps or contradictions in a set of postulates.

c) to remove redundance in a given set of postulates.

ESSAY FORM

1. The following are the postulates of a finite geometry:—

   1. Each pair of lines in S have at least point in common.
   2. Each pair of lines in S have not more than one point in common..
   3. Every point of S is on at least two lines.
   4. Every point in S is on not more than two lines.
   5. The total number of lines in S is four.
   6. The total number of points in S is four.

   Is there any logical self contradiction in the above? If so can you remove any postulates so that the remaining postulates are free from logical self contradiction.

2. Suppose the postulates 1 to 5 remain the same, but postulate 6 is "Every point in S belongs to two and only two lines."
   Remove the redundant postulates if any.

3. Construct a mathematical table for the three complex roots of unity 1, w, w^2. Show that they form a group.

4. $x^2 - 4 = x - 2$ when $x = 2$, divide both sides by the same number $x - 2$, we get $x + 2 = 1$ when $x = 2$ or $4 = 1$. Find the fallacy in the mathematical argument.

5. The series for $\log 1 + x$ is $x - x^2/2 + x^3/3 -$

   Can we say that $\log 3 = 2 - \frac{4}{2} + \frac{8}{3}$

   Support your argument with explanation.

3 RECOGNITION FORM

TERMS OF POSTULATIONS AND LOGICAL STRUCTURE

d) to construct mathematical systems from a given set of data.

e) to detect fallacies in mathematical arguments.

RECOGNITION FORM

DIRECTIONS: In each of items 1-4 you are asked to determine the truth or falsity of a certain proposition on the basis of the truth or falsity of the constituent propositions p and q. Select the correct answer from the alternatives given and blacken the corresponding answer space.

1. p & q is true if, and only if,
2. p v q is false if, and only if,
3. p q is false if, and only if,
4. $\rightarrow[p \vee (\sim q)]$ is true, if and only if,

(A) p is true and q is false.
(B) p is false and q is true.
(C) p and q are both true.
(D) p and q are both false.
(E) None of the foregoing.

Consider a *commutative group* G with elements a, b, c, . . . and identity element e whose binary operation is denoted by *. A group G is called a *commutative group* if it is a group (that is, satisfies postulates 1, 3, 4, and 5 below) and in addition satisfies postulate 2 below.

POSTULATES OF G:

1. For all elements x and y of G, there exists a unique element $x * y$ of G.
2. For all elements x and y of G, $x * y = y * x$.
3. For all elements x, y, and z of G, $x * (y * z) = (x * y) * z$.
4. There exists a unique element e of G (called the identity element) such that for all elements x of G, $e * x = x$.
5. For each element x of G there exists a unique element x' of G (called the inverse of x) such that $x' * x = e$, where e is the identity element of Postulate 4.

Objective 3

6. $\frac{5}{3} = \frac{5\times 0}{3\times 0} = \frac{0}{0} = 1.$

   Trace the exact steps involving fallacy.

7. State the postulates of Euclid's geometry according to Heath. Can we justify the construction of an equilateral triangle on a given base according to the above postulates? Explain your arguments.

(Continued) RECOGNITION FORM

Consider also the following definition of a second binary operation applicable to the elements of G.

DEFINITION OF "|":

For all elements x and y of G, $x|y = x * y'$ where y' is the inverse of y.

DIRECTIONS: Read the postulates and definition given above carefully. In each of items 5-10 you will be asked to apply the information provided by the postulates and definition toward finding certain elements of G. Find the correct answer among the alternatives given and blacken the corresponding answer space.

If x and y are elements of G,

5. x|x is the element
6. e|x is the element
7. x|e is the element
8. e|e is the element

(A) e
(B) x
(C) x * x
(D) x′
(E) None of the foregoing.

9. x|y = e implies that y is an element such that
10. y|y = y implies that y is an element such that

(A) y = e
(B) y = y′ but no necessarily such that y = e
(C) y = x
(D) y = y * y but not necessarily such that y = e
(E) None of the foregoing.

DIRECTIONS: In items 11-15 we shall be concerned with a proof of an algebraic proposition. The steps in the proof are given. You are to select a *reason* for each step from the list of reasons given. Find the reason for each step among the given alternatives and blacken the corresponding answer space.

PROPOSITION TO BE PROVED: If a is any non-zero real number and m and n are any *negative* integers, then $a^m \cdot a^n = a^{m+n}$.

Objective 3

(Continued) RECOGNITION FORM

PROOF :

11. Step 1. $a^m \cdot a^n = \frac{1}{a^{-m}} \cdot \frac{1}{a^{-n}}$ The reason for step 1 is

12. Step 2. $= \frac{1}{a^{-m} \cdot a^{-n}}$ The reason for step 2 is

13. Step 3. $= \frac{1}{a^{-m + (-n)}}$ The reason for step 3 is

14. Step 4. $= \frac{1}{a^{-(m + n)}}$ The reason for step 4 is

15. Step 5. $= a^{m + n}$ The reason for step 5 is

REASONS FOR STEPS OF THE PROOF :

(A) If x is any real number and m and n any *positive* integers, then $x^m \cdot x^n = x^{m + n}$.

(B) If x is any non-zero real number and n is any integer, then $x^{-n} = \frac{1}{x^n}$ and $x^n = \frac{1}{x^{-n}}$.

(C) If x and y are any real numbers, $-x + (-y) = -(x + y)$.

(D) If x is any real number and $x > 0$, then $-x < 0$.

(E) If x, y, z, and w are any real numbers, $y \neq 0$, $w \neq 0$, then

$$\frac{x}{y} \cdot \frac{z}{w} = \frac{xz}{yw}$$

SELECTED REFERENCES ON EDUCATIONAL EVALUATION

1
Bloom, B. S.
Changing Conceptions of Examining
In Dressel, P. Editor,
Evaluation in General Education
(Iowa, William Brown and Co., 1954.)

Brief history of the work of the Board of Examiners of the University of Chicago. It summarizes the changes in emphasis, testing procedures, and research of the Board.

2
Bloom, B. S. (editor)
Taxonomy of Educational Objectives
Longmans, Green and Co., New York, 1954.

A classification of educational objectives accompanied by illustrative educational objectives and test exercises.

3
Buros, Oscar K.
The Fourth Mental Measurement Yearbook
Gryphan Press, New Jersey, 1953.

A description and review of the major standardized tests.

4
College Faculty
The Idea and Practice of General Education
University of Chicago Press, Chicago, 1950.

Section II, Examining, summarizes the examining process in the College of the University of Chicago, placement tests, and the effects of independent comprehensive examinations. Includes selected items from the comprehensive examinations.

5
Committee on Measurement and Evaluation
College Testing: A Guide to Practices and Programs
Washington, D. C., American Council on Education, 1959.

The role of measurement in relation to educational problems of the college, and descriptions of selected college and university testing programs.

6
Dressel, Paul, editor
Evaluation in General Education
William Brown and Co., Iowa, 1954.

Description of work done in the colleges which have Boards of Examinations or Examination Offices.

7
Dressel, Paul, and Mayhew, Lewis
General Education: Explorations in Evaluation
American Council on Education, Washington, D. C., 1954.

Application of evaluation methods to the study of general education programs in a number of American colleges.

8
Furst, Edward J.
Constructing Achievement Tests
Longmans, Green and Co., New York, 1958.

The principles of evaluation are discussed in detail. Detailed consideration of the steps in test construction including planning the test, writing items to fit specifications, assembly and reproduction, administration and scoring, and analysis and revision.

9
Hawkes, H. E., Lindquist, E. F., and Mann, C. R.
Construction and Use of Achievement Tests
Houghton Mifflin Co., Boston, 1936.

The book is divided into two parts; the first being a development of the general theory of testing and test techniques; the second being the application of appropriate test techniques to different objectives in certain subject matter areas. The first part includes a statement of test philosophy, a brief resume of some of the theory behind such mechanics of test construction as distribution of item difficulty, as well as descriptions of test forms including some of their advantages and disadvantages.

10
Lindquist, E. F., editor
Educational Measurement
American Council on Education, Washington, D. C., 1951.

Chapters by outstanding workers in the testing field on the functions of measurement in education, the construction of achievement tests, and measurement theory.

11
Brownell, W. H., Chairman
The Measurement of Understanding
National Society for the Study of Education, 45th Yearbook, Part I, 1946.

This book defines and discusses the problem of evaluating understanding. It gives examples of, and suggestions for, its measurement in certain subject matter areas.

12
Smith, Eugene, and Tyler, R. W.
Appraising and Recording Student Progress
Harper and Brothers, New York, 1942.

This is particularly valuable because it gives an account of some of the thinking behind the development of evaluation techniques designed to test objectives hitherto considered intangible (e.g., critical thinking, social sensitivity, appreciation, interests, and adjustment).

It discusses such problems of evaluation as interpretation and use of evaluation data, planning and administering an evaluation program, and the use of records for guidance and transfer.

13
Tyler, Ralph W.
Achievement Testing and Curriculum Construction
(In Trends in Student Personnel Work, edited by E. G. Williams, University of Minnesota Press).

This is the reference which most completely and directly describes the function of achievement tests in the construction of a curriculum.

14
Tyler, Ralph W.
Constructing Achievement Tests
Ohio State University Press, Columbus, Ohio, 1934.

A collection of reprints of articles which brings together some of the more important of Dr. Tyler's writings in this field.

LIST OF THE DELEGATES WHO ATTENDED THE SEMINAR ON EXAMINATION REFORM HELD AT THE OSMANIA UNIVERSITY

From 10th July to 13th July, 1958

Dr. H. J. Taylor.

Professor K. Neelakantam, Department of Chemistry, Sri Venkateswara University, Tirupati.

Professor K. N. Menon, Madras University, Chepauk, Madras.

Dr. C. V. Suryanarayana, Reader in Chemistry, Annamalai University, Annamalainagar, South Arcot District.

Shri C. J. Dasa Rao, Andhra University, Waltair.

Dr. V. Gore, Professor of Chemistry, Mahakoshal Mahavidyalaya, Pachapedi, Jabalpur.

Prof. P. P. Pillai, Head of the Department of Chemistry, Kerala University, Trivandrum.

Prof. Thotappa, Professor of Political Science, Mysore University, Mysore.

Dr. Sukumaran Nair, Head of the Department of Political Science, Kerala University, Trivandrum.

Dr. Ramchandraiah, Professor of History, Andhra University, Waltair.

LOCAL MEMBERS

Late Prof. M. Sayeeduddin, Principal, University College of Science, Osmania University.

Prof. M. A. Qader, Principal, University College of Arts and Commerce, Osmania University.

Dr. S. Sri Devi, Principal, Women's College, Hyderabad.

Dr. N. V. Subba Rao, Head of the Chemistry Department, Osmania University.

Shri P. V. Rajgopal, Head of the Department of the Political Science, Osmania University.

Shri Ziauddin Khan, Reader in the Department of Political Science, Osmania University.

Shri S. Vijaya Raghavan, Lecturer in the Department of Political Science, Nizam College, Hyderabad.

Shri L. B. Deshpande, Controller of Examinations, Osmania University.

Shri Venkobacharay Upadhyaya, Reader in the Department of Chemistry, Osmania University.

Dr. (Mrs.) R. M. Patel, Reader in the Department of Chemistry, Women's College, Hyderabad.

Shri S. Raghunathan, Reader in the Department of Chemistry, Nizam College, Hyderabad.

Smt. Syed Zohara Begum, Principal, College of Education, Osmania University.

Smt. Mumtaz Habib, Reader in the Department of Political Science, Women's College, Hyderabad.

Shri K. Vedantachari, Reader in the Department of Education, College of Education, Osmania University.

LIST OF THE DELEGATES WHO ATTENDED THE SEMINAR ON EXAMINATION REFORM HELD AT POONA UNIVERSITY

From 17th July to 20th July, 1958

(1) *Poona University :*

Prof. S. G. Hulyalkar, S. P. College, *Poona–2.*

Prof. V. K. Kothurkar, University of Poona, *Poona–7.*

Dr. T. S. Mahabale, University of Poona, Ganeshkhind, *Poona–7.*

Prof. V. V. Apte, Fergusson College, *Poona–4.*

Prof. P. R. Bhagawagar, N. Wadia College, *Poona–1.*

Dr. V. M. Dandekar, Gokhale Institute of Politics and Economics, *Poona–4.*

Prof. T. M. Joshi, Fergusson College, *Poona–4.*

Shri S. G. Puranik, Principal, H. P. T. College, *Nasik.*

(2) *Bombay University :*

Shri K. T. Merchant, Principal, Sydenham College of Commerce and Economics, *Bombay–1.*

Rev. F. H. Santapau, St. Xavier's College, Cruickshank Road, *Bombay–1.*

(3) *Nagpur University :*

Dr. L. B. Kajale, College of Science, *Nagpur.*

Shri B. H. Munje, Professor of Economics, S. B. City College, *Nagpur.*

(4) *M. S. University of Baroda :*

Prof. A. R. Chavan, Professor and Head of the University Department of Botany, Faculty of Science, *Baroda.*

Shri H. C. Malkani, Reader and Head of the University Departmentt of Economics, Faculty of Arts, *Baroda.*

Shri C. M. Shukla, Principal, Intermediate College, *Baroda.*

Shrimati Indira Bhanot, Reader in Statistics, Faculty of Science,, *Baroda.*

Shri B. G. Desai, Assistant Registrar, M. S. University of Baroda,, *Baroda.*

(5) *S. V. Vidyapeeth :*

Prof. J. G. Chohan, Professor of Botany, Vallabhbhai Mahavidyalaya,, *Vallabhvidyanagar.*

Shri Rajanikant Laxmichand Sanghavi, Professor of Economics,, Vithalbhai Patel Mahavidyalaya, *Vallabhvidyanagar.*

(6) *Karnatak University :*

Shri S. W. Mensinkai, Principal, College of Agriculture, *Dharwar.*

Prof. V. V. Borkar, University Department of Economics, *Dharwar.*

(7) *Gujarat University :*

Shri H. N. Pathak, University School of Social Sciences, Gujarat University, *Ahmedabad.*

Shri J. D. Oza, Lecturer in Botany, Gujarat College, *Ahmedabad.*

(8) *S. N. D. T. Women's University, Bombay :*

Dr. (Smt.) Chandrakala A. Hate, Snehasadan, Top Floor, Hunsalwadi, Girgaum, *Bombay—4.*

Dr. V. G. Agashe, 95-B, Prabhat, Deccan Gymkhana, *Poona—4.*

LIST OF THE DELEGATES WHO ATTENDED THE SEMINAR ON EXAMINATION REFORM HELD AT PATNA UNIVERSITY

From 23rd July to 26th July, 1958

Sl. No.	*Name of the University*	*Name of the delegate with designation.*
1.	Bihar	Dr. Bimaleshwar De, Head of the University Department of Psychology, Bihar University, Langat Singh College, Muzaffarpur.
2.	Calcutta	Dr. S. Sinha, Reader, Department of Psychology, Calcutta University, Calcutta.
3.	Patna	1. Dr. N. S. Nagendranath, Head of the Department of Mathematics, Patna University, Patna.
		2. Dr. V. R. Chariar, Professor of Mathematics, Science College, Patna.
		3. Shri Janardan Jha, Lecturer in Mathematics Methodology, Patna Training College, Patna.
		4. Shri Bhola Singh, Professor of Mathematics, Bihar College of Engineering, Patna.
		5. Shri N. Chatterjee, Assistant Professor of Mathematics, University Department of Mathematics, Patna University, Patna.
		6. Shri Rameshwar Prasad, Head of the Department of Education, Patna University, Patna.

		7. Shri M. Z. Abdin, Head of the Department of Psychology. Patna University, Patna.
		8. Dr. A. K. P. Sinha, Assistant Professor of Psychology, Patna College, Patna.
		9. Mrs. S. Mathur, Lecturer in Psychology, Institute of Psychological Research & Service, Patna University, Patna.
		10. Dr. S. M. Mohsin, Hony. Professor of Psychology, Patna University and Director, Education & Vocational Guidance Bureau, Government of Bihar, Patna.
4.	Visva-Bharati	Shri Nripendra Nath Ghosh, Lecturer & Head of the Department of Mathematics, Visva-Bharati, Shantiniketan, West Bengal.
5.	State Government of Bihar	1. Shri M. Rahman, Lecturer, Teachers' Training College, Bhagalpur.
		2. Miss Uma Sinha, Inspectress of Schools, Patna.

N.B. Inaugural session of the Seminar was also attended by the following representatives who were nominated by the Universities in the first instance, in view of the fact that the Seminar was on examination.

1. Dr. K. K. Dutta,
   Professor of History &
   Dean of the Faculty of Arts,
   Patna University, Patna.
2. Shri A. Narayan,
   Controller of Examinations,
   Bihar University, Patna.
3. Dr. S. P. Singh,
   Dean of the Faculty of Science,
   Bihar University, Patna.

LIST OF THE DELEGATES WHO ATTENDED THE SEMINAR ON EXAMINATION REFORM HELD AT ALIGARH MUSLIM UNIVERSITY

From Ist August to 4th August, 1958

Dr. Bisheshwar Prasad, Head of the Department of History, Delhi University, Delhi.

Dr. F. C. Auluck, Professor of Physics, Delhi University, Delhi.

Dr. M. L. Sharma, Head of the Department of History, Rajasthan University, Jaipur.

Dr. S. M. Mitra, Dean of the Faculty of Science, Birla College of Science & Commerce, Pilani (Rajasthan).

Dr. Hari Ram Gupta, Professor and Head of the Department of History, Panjab University College, Hoshiarpur.

Dr. B. M. Anand, Professor and Head of the Department of Physics, Panjab University College, Hoshiarpur.

Dr. D. N. Shukla, Assistant Professor in the Department of History, Allahabad University, Allahabad.

Shri Sri Krishnaji, Assistant Professor in the Department of Physics, Allahabad University, Allahabad.

Dr. A. K. Mukherji, Head of the Department of Physics, Agra College, Agra University, Agra.

Dr. A. L. Srivastava, Head of the Department of History, Agra College, Agra University, Agra.

Dr. R. S. Sharma, Department of Physics, Banaras Hindu University, Banaras.

Dr. Hira Lal Singh, Department of History, Banaras Hindu University, Banaras.

Dr. P. J. Philip, University Grants Commission, New Delhi.

Dr. V. S. Patankar, University Grants Commission, New Delhi.

LOCAL MEMBERS

Shri B. C. Asthana, Secretary – Recorder of the Seminar, Officer on speciaial duty, Psychometric Unit, Aligarh Muslim University, Aligarh.

Shri Q. H. Zaidi, Deputy Registrar, Incharge of Examinations, Aligarirh Muslim University, Aligarh.

Dr. A. Mujeeb, Head of the Department of Education, Aligarh Muslirim University, Aligarh.

Shri R. N. Jog, Psychometric Unit, Aligarh Muslim University, Aligarhh.

(List is incomplete for want of a confirmation of this list from the University.)

PROGRAMME OF THE SEMINARS ON EXAMINATIONS

Name of the University	*Date*	*Participating Universities.*
1. Osmania	10th July to 13th July, 1958.	Osmania Madras Annamalai Andhra Sri Venkateswara Kerala Mysore Saugar Jabalpur Vikram
2. Poona	17th July to 20th July, 1958.	Poona Bombay Baroda Anand Gujarat Karnatak S.N.D.T. Women's University, Bombay. Nagpur
3. Patna	23rd July to 26th July, 1958.	Patna Bihar Calcutta Jadavpur Visva-Bharati Gauhati Utkal

4. Aligarh	1st August to 4th August, 1958	Aligarh Panjab Delhi Gorakhpur Kurukshetra Roorkee Allahabad Lucknow Agra Banaras Jammu & Kashmir Rajasthan