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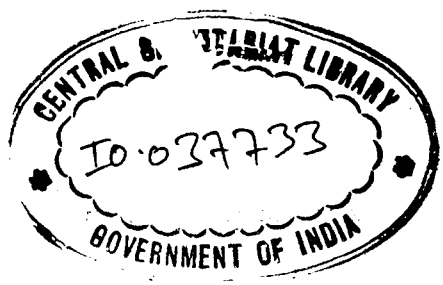
PROGRESS
OF
TECHNICAL EDUCATION
IN
UTTAR PRADESH

(A Review)

Covering Degree and Diploma Courses

DEPARTMENT OF TECHNICAL EDUCATION
GOVERNMENT OF UTTAR PRADESH
1966



FOREWORD

The relative importance of technical education for the economic, social and industrial advancement of our country is much greater amongst all the developmental activities. For every project of P. W. D., Irrigation, Power, Communication, Transport and Industry, we need technically qualified men at all levels. Further it takes a period of 3 and 4-5 years respectively before a diploma or a degree holder in any engineering or technological course can be trained. Then there are always limitations of resources in providing for training facilities such as lack of finance, foreign exchange for imported equipment, lack of indigenous equipment and building material. It costs a minimum of Rs.70 lakhs and Rs.25 lakhs respectively to set up a new degree engineering college and a polytechnic for the smallest unit of 120 students apart from the additional requirement of recurring expenditure, and hostels for students and staff quarters. On the other hand, non-availability of technically qualified personnel may completely cripple any of the developmental scheme, however, urgent it may be. It is, therefore, extremely necessary not only to plan and provide for training facilities in advance, but also to utilise the available facilities to the maximum possible extent.

I am glad that an analytical study has been made of the progress in U. P. in Technical Education at the degree and diploma level and I hope the study will be found useful by those who are entrusted with the responsibility of the development of technical education in this State.

Sucheta Kripalani

LUCKNOW :
Dated September 27, 1966.

(SUCHETA KRIPALANI)

PREFACE

Technical Education provides the basis for all-round economic development. Uttar Pradesh has lagged behind in this field during the last decade, as compared to other States. Some progress has, no doubt, been made towards the end of the Third Plan, particularly during the first year of the Fourth Plan, to bridge the widening gap in the demand and supply of technical personnel, both as regards middle level technicians and engineers. A lot of ground has yet to be covered. Apart from the quantitative aspect of the matter, it is essential that adequate attention is paid during the Fourth Plan to the quality of technical personnel produced by the polytechnics and engineering colleges.

This booklet attempts to make an analytical study of the progress made in the field of Technical Education in Uttar Pradesh. Comparative position about available facilities in the State *vis-a-vis* other States has also been indicated, where necessary. I am glad that special attention has been paid in this study about the qualitative aspect of the matter and the wastages in our technical institutions. Our thanks are due to Dr. T. G. K. Charlu, ex-Director of Technical Education, Sri S. C. Goil, Director of Technical Education and Sri S. K. Mittal, Secretary, Board of Technical Education, who have been closely associated with this study.

It may be mentioned that the views expressed in Chapter III are the individual views for consideration and not necessarily the views of the State Government.

S. S. SIDHU

Secretary to Government, U. P.,
Technical Education Department.

LUCKNOW :
Dated October 5, 1966.

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CHAPTER—I

DEVELOPMENT

Introduction

1. There is no universally accepted definition of Technical Education. Broadly speaking all branches of training which are outside the scope of general or academic education come under the ambit of technical education. As a result, it does cover even such fields as Industrial Management, Commerce and Applied Arts[6]. In this chapter, therefore, alongwith the expansion of facilities in Civil, Electrical and Mechanical Engineering, the facilities created in other degree courses such as Chemical Engineering, Mining and Metallurgical Engineering, Agricultural Engineering, Tele-Communication Engineering, Architecture, Textile Technology and Textile Chemistry and in diploma courses such as Printing Technology (Letter Press Printing and Lithography), Textile Technology and Textile Chemistry, Leather Technology (Tanning), Architectural Assistantship, Automobile Engineering, Electronics, Stenography and Secretarial Practice and Pulp and Paper Technology have also been discussed.

Position upto the end of First Plan

2.1. In 1947 when India attained independence there were only three institutions offering courses in Civil, Electrical and Mechanical Engineering at the degree level. The College of Technology and College of Mining and Metallurgy under the Banaras Hindu University, the Harcourt Butler Technological Institute at Kanpur and the Allahabad Agriculture Institute at Allahabad offered courses in Chemical Technology, Glass and Ceramics Technology, Pharmaceutics, Mining and Metallurgical Engineering and Agricultural Engineering. During the First and Second Plan periods, there was not much expansion of the technical education facilities at the degree level. An Engineering College at Dayalbagh, Agra, was set up in 1950 with an intake of 60. There was no increase of institutions in the First Plan. A degree course in Textile Technology and Textile Chemistry was started in Government Central Textile Institute, Kanpur in 1958. Towards the end of Second Plan, the Indian Institute of Technology was started at Kanpur in 1960. The total seats for all courses

and in all institutions situated in the State increased to 624 at the end of the First Plan and to 1130 at the end of Second Plan (Appendix 1.1).

2.2. At the diploma level, the number of institutions was eleven[6], offering courses in Civil, Electrical and Mechanical Engineering and in Textile Technology, Textile Chemistry and Weaving Technology. The total intake was 578. In 1949, I. D. Technical Institute, Bahjoi started diploma classes in Electrical and Mechanical Engineering. Then in 1955, M. G. Polytechnic was started at Hathras and a Civil Engineering School was set up at Allahabad and the total intake of all the institutions increased to 1809 at the end of the First Plan (Appendix 1.2). During the First Plan, building activity increased and there was great demand for Civil Overseers and similar demand was anticipated during the Second Plan[6]. As a result of this anticipated demand, a number of Civil Overseer institutions were started by private bodies in 1956. The existing institutions running Civil Overseer courses also increased their intake. The total intake thus increased to 4417 in 1956-57 i.e. in the beginning of the Second Plan (Appendix 1.2). This situation, however, continued for a year or two only when the admissions were reduced in the institutions for lack of students coming forward to join the course. The Board of Technical Education, set up in 1958, further reduced the admission capacity of each institution corresponding to the physical facilities available in that institution. As a result, some of the sub-standard institutions closed down Admission to diploma courses were discontinued in I. D. Technical Institute, Bahjoi in 1959 on the recommendations of Government of India. Some new institutions were, however, also added during the Second Plan as part of the plan schemes. An Institute of Printing Technology was established at Allahabad in 1957. Thus during the Second Plan, considerable changes took place in the number of institutions as well as in the intake. The total intake was in fact reduced to 2370 (Appendix 1.2).

Third Plan

3. During the Third Plan, two new degree institutions have been established i.e., the Motilal Nehru Regional Engineering College at Allahabad and the Madan Mohan Malviya Engineering College at Gorakhpur. Also a College of Agricultural Engineering and Technology was set up under the U. P. Agriculture University at Pantnagar with an intake of 75 students in Agricultural Engineering. By the end of the Third Plan, the intake of degree courses in Civil, Electrical and Mechanical Engineering in institutions situated in the

State increased to 840 excluding the intake at the Engineering Colleges under the Banaras Hindu University, Varanasi, Aligarh Muslim University, Aligarh and the Indian Institute of Technology, Kanpur (Appendix 7—column 11). The total intake including that of the central institutions and of other courses such as Chemical Engineering, Chemical Technology, Mining, Metallurgical Engineering, Agricultural Engineering, Architecture and Tele-Communication Engineering was 2402 (Appendix 7—column 16).

Re-organisation of Courses

4.1. During the Second Plan, the courses were re-organised both at the degree and diploma level. The duration of degree courses was raised from three to four years after Intermediate Science and in some institutions it was raised to five years after Higher Secondary pass. At the diploma level, the duration of Civil Overseer course was raised to three years and a uniform syllabus was adopted for all the courses on the pattern of the National Certificate Course.

4.2. At present, degree courses are running in this State on three patterns. The Indian Institute of Technology, Kanpur is running a five-year *integrated* course after Higher Secondary. The Colleges under the Banaras Hindu University are generally running the five-year *integrated* course as well as making direct admissions of Intermediate pass boys in Second year. The same is the case with the College of Engineering and Technology, Aligarh Muslim University, Aligarh. The Roorkee University, Roorkee and the remaining colleges in the State are running four-year degree courses after Intermediate. The Harcourt Butler Technological Institute, Kanpur is running five technological courses of three-year duration also with B. Sc. as admission qualification. This is the revised pattern approved by the Government of India for degree courses in technological fields.

4.3. At the diploma level, almost all Civil Overseer institutions were converted into Polytechnics during the Third Plan with diploma courses in Civil, Electrical and Mechanical Engineering and the total intake increased to 4710 at the end of the Third Plan including the intake of the University Polytechnic at Muslim University, Aligarh (Table 1). There was a significant increase in the facilities for admission in Mechanical and Electrical Engineering as it was anticipated that there would be more and more need for diploma holders in Mechanical and Electrical Engineering with the development and growth of industries in the country.

TABLE 1

(Showing increase of facilities in diploma courses in Civil, Electrical and Mechanical Engineering during the Third Plan)

Serial no.	Total seats	1961-62	1962-63	1963-64	1964-65	1965-66
1	Civil Engg.	1,470	1,390	1,340	1,420	1,480
2	Elect. Engg.	540	785	1,415	1,495	1,615
3	Mech. Engg.	540	790	1,415	1,495	1,615
4	Total	2,550	2,965	4,170	4,410	4,710

NOTES (1)—The detailed figures are taken from Appendix 8.
(2) These figures exclude facilities for part-time courses.

Technicians' Courses

5. A scheme of "Technicians course" of two-year duration was introduced in 1964 at Naini Tal Polytechnic, Naini Tal and Government Polytechnic, Lucknow. The admission qualification is Intermediate Science. Courses in Civil Engineering (Civil Construction Technology), Mechanical Engineering (Machine Tool Technology) and Electrical Engineering have been introduced. The object of these courses is to divide the basic branch of engineering into certain broad fields directly related to the functions which the diploma holders are expected to perform in their profession after completing their training in the institutions. More emphasis has been given to practical work in the particular speciality selected and, on the other hand, care has been taken to ensure that adequate basic instructions are provided in Mathematics, Physical Science, Engineering Sciences and Allied Engineering subjects. The scheme has been started on an experimental basis and its full utility will only be known after a few batches pass out and enter into employment.

Part-time Courses

6.1. Part-time diploma courses have been introduced in order to[4]

(i) create facilities for the advancement of knowledge, thereby enabling those technical persons employed in industry or in a technical department of the Government to improve their future prospects by qualifying for holding more responsible executive or supervisory duties, who by reasons of family circumstances or otherwise could not pursue higher courses of technical study at the initial stage and entered into a profession with less or no technical qualification, viz. (a) skilled workers having no certificate in any trade aspiring to obtain a certificate, (b) certificate holders aspiring to have a diploma, and (c) diploma holders aspiring to get a degree, and

(ii) relieve pressure on the demand for higher technical education viz. on degree or even diploma courses in the initial stage and to encourage young

men to enter into the profession in greater numbers at the early age at lower levels i.e. at the level of craftsmen or even technicians.

Similar part-time degree courses are also proposed to be introduced.

6.2. Part-time courses were introduced in this State at the diploma level in 1964 at Hewett Polytechnic, Lucknow and Government Poytechnic, Kanpur for courses in Civil, Electrical and Mechanical Engineering. Facilities for part-time diploma courses in Printing Technology were introduced at the Northern Regional Institute of Printing Technology, Allahabad even earlier. These are given in Table 2:

TABLE 2

(Showing facilities for part-time diploma courses)

Serial no.	Name of Course	Sanctioned intake
1	Printing Technology † (Letter Press Printing and Lithography)	60
2	Civil, Electrical and Mechanical Engineering	200
	Total	260

6.3. There are, however, considerable difficulties on account of which the scheme is not very successful at present. The employees have to work full time in their own organisations and have to take these courses in addition. They have also certain family responsibilities to attend to. It is, therefore, very difficult for them to devote even half as much time, as a full time student can devote at home. There is, therefore, a heavy drop-out in these courses.

7. During the Third Plan, a Girls' Polytechnic was set up at Lucknow in 1963 with courses in (i) Architectural Assistantship, (ii) Electronics and (iii) Stenography and Secretarial Practice. The object is to train girls so as to make them productive members of the community and to enable them to find gainful employment outside their domestic duties without their necessarily looking on marriage as a secure career. There are, however, certain difficulties in a project of this type. Vocational education for girls and women, to equip them for taking specific occupations, is a relatively new concept in this country; such a training is a matter of comparatively recent development even in the West[6]. Because of the social and traditional bondages, not many girls are yet prepared to take up courses of this nature. The employment opportunities have also not yet been fully established. As a result, the

† No admissions made in 1966-67.

number of girls taking admissions so far in Electronics and Architectural Assistantship has been small, although the position is improving gradually (Table 3).

TABLE 3

(Showing details of admissions in first year at the Government Girls' Polytechnic, Lucknow and the number of girls passing the first year)

Serial no.	Course	For batch admitted in first year in the Session	Sanctioned intake	Number of admissions in first year	Number appeared in first year examination at the end of the Session	Number passed including Supplementary
1	2	3	4	5	6	7
1	Electronics	1963-64	30	6	6	4
		1964-65	30	19	13	6
		1965-66	30	17	15	9
2	Architectural	1963-64	20	6	6	5
	Assistantship	1964-65	20	5	4	4
		1965-66	20	8	8	7
3	Stenography,	1963-64	30	28	26	19
	and Secretarial	1964-65	30	30	22	14
	Practice.	1965-66	30	30	21	18

8. In order to meet the need of Technical personnel of the Paper Industry, a School of Paper Technology was set up in 1965 at Saharanpur under the Swedish Aid Programme for Diploma and Certificate courses in Pulp and Paper Technology[6]. The most important feature of this school is its close co-operation with the Paper Industry. It is, however, not sufficient to locate a Polytechnic near an industrial complex. For being immediately useful to industry, a living contact between the industry and the institution is most essential[3]. Setting up an institution of this type, is a right step in this direction.

Comparison of Facilities on all-India basis and with other States

9.1. The facilities created in the State for Degree and Diploma courses upto the end of the Third Plan are, however, proportionately lower than the expansion that has taken place on an all-India basis. A summary of the facilities created in the State at the degree and diploma level is given in tabular form in Appendices 1.1 and 1.2. In the First Plan (1951—56) and Second Plan (1956—61), the number of degree engineering colleges increased from 53 to 65 and 102 respectively on an all-India basis[10], whereas the number of institutions added in this State was none in the First Plan and one during the Second Plan. Two engineerng colleges were, however, established in the Third Plan in this State. The intake has increased at the degree level from 2,940 in

1947 to 24,000 in 1965-66[3] on all-India basis whereas it has increased from 528 to 2,402 in 1965-66 in this State for all the courses and in all institutions situated in Uttar Pradesh. In terms of percentages based on 1947, the increase at the degree level comes to 8 times on an all-India basis and 4.5 times for this State (Table 4).

TABLE 4

(Showing a comparative statement of percentage increase in intake at the degree and diploma level on an all-India basis and in Uttar Pradesh).

Serial no.	Year	Degree		Diploma	
		All-India figures[8]	Intake for all courses and for all institutions in U. P. (See Appendix 1·1)	All-India figures	Intake in U. P. for all courses, and for all institutions (Appendix 1·2)
1	2	3	4	5	6
	1947-48	2,940	528	3,670	578
	First Plan.				
	1951-52	4,790	626	6,220	757
	1955-56	5,890	624	10,480	1,809
	Second Plan.				
	1956-57	6,610	648	10,320	4,417
	1960-61	13,820	1,130	25,800	2,370
	Third Plan.				
	1961-62	15,690	1,240	27,690	2,670†
	1965-66	24,000	2,402	44,000	4,965†
	Increase at the end of Third Plan*	8	4·5	12	8·5

NOTE—All-India figures are taken from Table 1 of the Fourth Five-Year Plan—A Draft report[3].

*Based on 1947-48 facilities.

9.2. If the expansion in Uttar Pradesh is compared with the expansion that has taken place in other States, it is noticeable that Uttar Pradesh lags behind many other States in India. Mysore has 11†† engineering institutions[7] offering degree courses in Civil, Electrical and Mechanical Engineering whereas there are only 8 in this State. Maharashtra and Madras each have 9 institutions offering courses in Civil, Electrical and Mechanical Engineering.†††

†Excludes part-time courses.

††According to the information included in a booklet "Survey of Facilities—First Degree courses (1964)" issued by Government of India, Ministry of Education, there are 4 other unapproved institutions offering courses in Civil, Electrical and Mechanical Engineering.

†††Survey of Facilities—First Degree Courses (1964) issued by Government of India.

On population basis also, the intake of engineers per lakh of population was very low in this State not only in 1961 but also in 1965-66.

Serial no.	State	Intake of engineers[10] per lakh of population as in 1961	Facilities per lakh of population at the degree level in 1965-66†
1	Mysore ..	6·0	9·41
2	Gujarat ..	4·9	7·15
3	Kerala ..	3·4	6·81
4	Madras ..	3·9	6·34
5	Maharashtra ..	3·9	5·36
6	Punjab ..	2·9	5·13
7	West Bengal ..	4·5	4·43
8	Rajasthan ..	2·0	4·32
9	Madhya Pradesh ..	3·4	4·87
10	Uttar Pradesh ..	1·5	1·75
11	All-India ..	3·1	5·21

9.3. Similarly the out-turn of engineering graduates as in 1961 in U. P. was lowest as compared to certain other States as indicated below[10]:

Serial no.	tate	Out turn of engineering graduates as in 1961 per lakh of population
1	Madras	2·75
2	Mysore	2·30
3	Gujarat	3·10
4	All-India	1·60
5	Uttar Pradesh	1·10

10. A further comparison of the intake in degree courses in the State with the out-turn of Intermediate Science students shows that the training facilities have been meagre as compared to the number of boys passing out each year (Table 5).

†Statement no. VI-2 and 3 of D. O. letter 25 (State Plans)/66, dated September 16, 1966 of Sri N. Rajagopal, Deputy Secretary of Planning (C) Department, Government of Uttar Pradesh to Secretary, Technical Education Department.

TABLE 5

(Showing out-turn of Intermediate Science students in U. P. and intake in degree courses since 1960-61)

Serial no.	Year of Examination	Boys passing Intermediate in Scientific group in U. P.	Intake in Degree courses in U. P. in the following session starting from 1961-62	Training facility as percentage of Intermediate Science students 4 (— × '00) 3
1	2	3	4	5
1	1961	10,408	1240	12
2	1962	13,259	1315	10
3	1963	13,032	1765	14
4	1964	14,665	1992	14
5	1965	19,736	2252	11

NOTES—1. Information in column 3 is about all candidates passing in Scientific group including those offering Biology or Military Science instead of Mathematics—information as obtained from the Secretary, Board of High School & Intermediate Education, U. P., Allahabad vide D. O. letter No I—B/CS-I/21, dated 3—5—1966.

2. For information in col. 4, refer to Appendix 9.

3. Many B. Sc. pass and M. Sc. pass boys studying in between stages in these courses also join degree courses in engineering, which could not be taken into account in column 4.

11. From the out-turn point of view, a comparative statement is made below of the out-turn of degree holders on an all-India basis and that from U. P. which shows that the figure of percentage of out-turn of degree holders in engineering and other courses from U. P. has been proportionately lower on population basis and the position has not much improved considering the out-turn till 1965-66.

TABLE 6

(Showing out-turn of engineering personnel including those in technological courses at the degree level in Uttar Pradesh as compared to All-India figures).

Serial no.	Year	Out turn in U.P.	Out-turn on All-India basis	Out-turn of U. P., (as percentage of All-India figure)
1	2	3	4	5
	Second Plan.			
1	1960-61	621	5,700	11
	Third Plan			
2	1861-62	660	7,030	9·5
3	1965-66	1,100 (Estimated)	10,500 (Estimated)	10·5

NOTES—1. Information about 1960-61 and 1961-62 in col. 3 is taken from Table III—8 of 'Man Power in Uttar Pradesh—A Fact Book'—Page 120'

2. Information in column 4 is taken from Table 1 of the Fourth Five-Year Plan of Technical Education'.

12. At the diploma level also it has been shown that the annual intake per lakh of population in 1961 was 3.0 for U. P., 8.9 for Madras, 7.3 for Punjab, 7.9 for West Bengal, 8.0 for Gujarat, 5.6 for Maharashtra and 5.8 on all-India basis[10]. Also when the number of students that have been passing out the High School Examination with Science and Mathematics during 1961—65 as given in Table 7 is compared with the figures of corresponding increase in the seats at the diploma level it is noticed that the training facilities in case of diploma courses have not much increased per 100 students passing out the High School Examination.

TABLE 7

(Showing out-turn of High School pass boys with Science and Mathematics and seats available in diploma institutions)

Serial no.	Year of examination	Out turn of High School pass boys with Science and Mathematics	Intake for diploma course in U. P. in the session following starting from (1961-62)	Training facilities as percentage of High School pass boys $\left(\frac{4}{3} \times 100\right)$
1	2	3	4	5
1	1961	32,315	2,550	8
2	1962	39,757	2,965	8
3	1963	41,862	4,170	10
4	1964	47,572	4,430	9·5
5	1965	53,597	4,710	9

NOTES—1. Information in column 3 is obtained from the Secretary, Board of High School and Intermediate Education, U. P., Allahabad, *vide* D. O. letter No IB/CS—1(2), dated 3-5-1966.

2. For figures in column 4, reference is made to column 19 of Appendix 8.

13.1. Sri L. S. Chandrakant, Joint Educational Advisor, Ministry of Education, Government of India has clearly brought out in the draft report on Fourth Five-Year Plan of Technical Education[3] (Table XVI—Comparative statement of Deficit State in Technical Education) that in proportion of the output of qualified candidates, Uttar Pradesh is one of the six deficit States in facilities for degree and diploma courses.† According to the information included in that report,†† the number of seats in degree institutions that

†Table XVI[3].

††Tables XV(*a*) and XV(*b*)[3].

would be available in U. P. per million of population in 1970-71 and those in certain other States would be as follows:

Serial no.	State	Seats in degree institutions per million of population in 1970-71 (Estimated)
1	Mysore	91
2	Gujarat	74
3	Madras	67
4	Madhya Pradesh	50
5	Rajasthan	50
6	All-India	52
7	Uttar Pradesh	19

13.2. Similarly at the diploma level, the number of seats that would be available per million of population in 1970-71 in U. P. and in certain other seats would be as follows :

Serial no.	State	Seats in diploma institutions per million of population in 1970-71 (Estimated)
1	Mysore	147
2	Punjab	154
3	West Bengal	144
4	Madras	113
5	All-India	98
6	Uttar Pradesh	70

13.3. All the above data clearly establish the fact that U. P. has not received its due share of facilities for technical education in comparison to the other States and there is a clear need, therefore, for special consideration for this State in sanctioning facilities in future.

14. From a comparison of the increase in intake at the diploma level in this State with All-India figures, it is indicated that the intake has increased from 3,670 in 1947 to 27,690 in 1961-62 and 44,000 in 1965-66 on All-India basis† whereas it has increased from 578 in 1947 to 2,670 in 1961-62 and 4,965 in 1965-66 only in U. P.†† In term of percentages based on 1947 figures, the increase comes to 12 percent in 1965-66 on all-India basis and 8.5 percent increase in this State (Table 4). These figures show that proportionate increase has been lower in U. P. Further a study of the out-turn of diploma holders as compared to out-turn on all-India basis (Table 8.2) shows that as in case of degree holders, the figure of percentage of out-turn of U. P. is proportionately lower on population basis although the position seems to have slightly improved considering the out-turn figures of 1965-66.

†Table 1—Fourth Five-Year Plan of Technical Education.[3].
††Excludes part-time courses (Appendix 1-2).

TABLE 8.1

(Showing out-turn of diploma holders including those in technological courses in Uttar Pradesh in 1960-61 and 1961-62)

Serial no.	Name of institution or Examining Body	1960-61					1961-62				
		Civil Engg.	Elect. Engg.	Mech. Engg	Other Courses	Total	Civil Engg.	Elect. Engg.	Mech. Engg.	Other Courses	Total
1	2	3	4	5	6	7	8	9	10	11	12
1	University Polytechnic, Aligarh Muslim University, Aligarh.	48	31	39	..	118	87	63	73	..	223
2	Diploma Polytechnic, Roorkee University, Roorkee.	90	50	42	..	182	104	55	43	..	207
3	Balwant Vidyapeeth Institute of Rural Higher Education, Bichpuri.	13	..	..	..	13	20	..	..	..	20
4	Board of Technical Education, U. P., Lucknow.	395	105	150	50	700	420	114	141	38	723
	Total	546	186	231	50	1013	641	232	262	38	1173

TABLE 8.2

(Showing out-turn of diploma holders including those in technological courses in U. P. as compared to all-India figures)

Serial no.	Year	Out-turn of U.P.	Out-turn [3] on All-India basis	Out-turn of U. P. as percentage of All-India figures
1	2	3	4	5
1	1960-61	1,013	7970	12·5
2	1961-62	1,173	10,850	11
3	1965-66	2,400 (Approximate)	17,000 (Estimated)	14

NOTES—1. Figures in column 4 have been taken from Table 1 of the draft report on the Fourth Five-Year Plan on Technical Education.[3]

2. Figures in column 3 are taken from Table 8.1.

†Letter no. 1384, dated 20-7-'66.
††Letter no. PF/APM/385, dated 7-7-'66.
†††Letter no. nil, dated 15-6-'66.

15. The facilities of training of diploma holders has to be looked from another angle also. The Engineering Personnel Committee[9] had expressed an opinion on the basis of the evidence then available before it that the ratio of degree to diploma holders should be at least in the neighbourhood of 1 : 3. In the recent report of Engineering Manpower,[11] it has been stated that the relative proportion of new graduate engineers to new engineering technicians in the composition of new engineering manpower has been changing from 1 : 1 in the First Plan through 4 : 5 in the Second Plan to 4 : 7 during the Third Plan on an all-India basis. According to the report of the Education Commission the aggregate ratio is today 1 engineer to about 1.4 technicians. This ratio varies from industry to industry and includes certificate as well as diploma holders. The Fourth Plan proposals, as tentatively drawn up, would see an increase in this ratio to about 1 : 1.5. According to the report, immediate goal should be to improve the over all ratio of engineers to technicians to 1 : 2.5 by 1975 and 1 : 3 or 4 by 1980.[12]

Fourth Plan

16.1. The Working Group on Technical Education in Uttar Pradesh recommended the following programmes for expansion of technical education during the Fourth Plan:

	Degree	Diploma
(i) Setting up of new Engineering College/Diploma Institutions.	1,080 seats	1,500 seats
(i) Expansion of existing Institutions	860 seats	3,840 seats
Total ..	1,940 seats	5,340 seats

16.2. The expansion programme as implemented in the session 1966-67 is given in Table 9.

TABLE 9

A—Expansion at the degree level.

Serial no.	Scheme of expension	Name of Institution	Seats
1	Opening of a new institution	New Engineering College, at Pantnagar.	150 seats
2	Additional seats in institutions at.	(i) Roorkee University, Roorkee.	45 seats
		(ii) Madan Mohan Malviya Engg. College, Gorakhpur.	90 seats (over the previous sanctioned intake of 120.
		(ii) H. B. Technological Institute, Kanpur.	210 seats
	Total ..	.. .. ..	495 seats

B—Expansion at the diploma level: Additional Seats—840 seats (includes 30 seats in Automobile Engineering)

16.3. In view of the fact that the training facilities created up to the end of Third Plan both at the degree and diploma level in this State have been comparatively very much less than those existing in most of the other States in the country, there is an urgent need for at least full expansion of the training facilities as proposed during the Fourth Plan. There is another factor also which has to be taken into account in considering the expansion programme of this State. Uttar Pradesh is perhaps one of the very few States in the country which has always had a completely 'open door policy' for non-U. P. applicants† with regard to admissions even in its State Engineering Colleges and Diploma Institutions which naturally means that a comparatively larger part of the out-turn from U. P. Institutions leaves the State on completion of training. There is, therefore, all the more need for strengthening the training facilities of this State.

†A detailed study into this aspect of admissions was recently made by the Board of Technical Education, U. P.

CHAPTER II

WASTAGE

Introduction

1. It costs a minimum of Rs.70 lakhs and Rs.25 lakhs respectively to set up a new engineering college and a polytechnic for the unit of 120 students apart from the recurring expenditure of about 10 and 3 lakhs respectively per annum. Institutions with higher admission capacity cost much more. These figures do not include expenditure on hostels and staff quarters. In addition to this heavy expenditure, the problem of the availability of human and material resources is also acute. No foreign exchange is available to import equipment from foreign countries and there is shortage of materials which are required for construction of buildings. Then there has been dearth of qualified personnel coming for the teaching profession. The Institute of Applied Manpower Research[8] has estimated the cost of engineering education per student at the first degree and polytechnic level and in arriving at the estimate of cost, the following three components of costs have been taken into account:

(i) Expenditure on salaries of professors, lecturers and other staff members and other recurring expenditure of the institution on the basis of number of students on roll in a year.

(ii) Depreciation allowance on equipment in the workshops and laboratories of the different departments. The normal life of each equipment costing more than Rs.5,000 was arrived at on the basis indicated below:

Deptt.		*Life*
Civil Engineering	...	20 years: 10 years in the ratio of 8:2.
Mechanical Engineering	...	20 years: 10 year in the ratio of 8:3
Electrical Engineering	...	20 years: 10 year in the ratio of 2:1
Physics	...	All equipment of 15 years life.
Chemistry	...	All equipment of 5 years life.

(iii) Depreciation allowance for institution buildings, workshop buildings. Average life of different types of buildings was taken as 100 years.

2. The estimates indicate that for a five year course, it costs per student about Rs.3,000 in a first degree institution (it costs much more in a Regional Engineering College and in the Indian Institutes of Technology) and Rs.1,900

per student for a diploma course of three years duration†. Therefore, apart from whatever facilities that may, as far as possible be added, there is an obvious need to adopt such measures by which the existing facilities could be utilised to the fullest possible extent so that maximum number of fully trained technical personnel could be turned out of the existing institutions. In this Chapter, it is proposed to bring out the wastage occurring in degree and diploma institutions with reference to the institutions situated in this State and the possible reasons of wastage and to suggest possible methods of reducing on the one hand the wastage and improving the quality on the other.

Factors responsible for wastage

3. There could be a variety of factors responsible for ultimate wastage and, therefore, before attempting to actually work out the wastage, it is considered necessary to mention these factors and also to specify which of these factors have been taken into account while working out the figures. For purpose of this study, the word 'wastage' may be defined as "the percentage of the total number of such seats which although forming a part of the sanctioned intake for an institution for a particular year in first year but against which no students finally passed out at the end of the course, as compared to the total sanctioned intake in the course for that particular year in that institution". The various factors contributing to this wastage could be:

(i) All the sanctioned seats for a particular course in a particular institution may not be filled up in first year.

(ii) The seats may be filled up but some of the seats may have to be filled up by students of less than average ability, thereby, causing larger failures. This may happen both in general seats or in the seats reserved for a specific class of students.

(iii) Seats may be filled up but students may discontinue their studies for one or more of the following reasons:

(*a*) Due to financial difficulties—Being unable to meet the expenses of the course.

(*b*) Being unable to develop intellectually to cope up with the course.

(*c*) Long absence on account of continuous illness.

(*d*) Developing a feeling that he made a wrong choice and finding himself completely disinterested in the course.

(*e*) Discontinuance on other personal reasons.

(iv) Students may be detained on account of not fulfilling the requirements of attendance or sessional marks as per examination rules and thus not being permitted to appear in the examination.

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† Pages 122 and 132—Review of Engineering Educational Institutions in India.[8]

NOTE—If a failed student subsequently passes, it only delays the output, may be that it causes stagnation but for purposes of this study he does not cause wastage.

(v) Students failing in an examination and then discontinuing their studies.

(vi) Students who fail repeatedly may have to be refused permission for further chances.

(vii) Wastage could also be on account of lack of suitable and qualified staff and lack of adequate training facilities in workshops and laboratories in an institution which may result in large scale failures.

Studies already carried out

4. 'A Preliminary Report on Wastage in Technical Education' was prepared by the Perspective Planning Division of the Planning Commission in 1959 and it was assessed therein that over all wastage on an all-India basis was 19·6 per cent in a degree course and 35·6 per cent in diploma courses and 'Wastage' was measured by the proportion of students in any one batch of admissions abondoning their studies without completing the course[1]. It accordingly included cases of all those students who left their studies for one reason or the other either before completion of a term or by not appearing in the examination or by not joining the next higher class or by failing in an examination and then discontinuing. It was also brought out in the report that a substantial proportion of the total wastage both in degree as well as diploma courses was accounted for by the wastage during the first year of the course. According to the report, 70 to 90 per cent of the wastage in degree courses takes place in the first two years of a four-year degree course and similarly in the diploma courses, the wastage in first year is uniformly high ranging from 55 to 80 per cent of the total wastage.

5. The question of the wastage at the degree and diploma level has also been recently studied on an all-India basis by the Institute of Applied Manpower Research[2]. It has worked out the wastage on the basis of 'Partially refined rate of final wastage'. 'The partially refined rate of final wastage' has been defined as 'the percentage of the number of students of a batch who have yet to complete at least two examinations in a 3-year course and 3 more examinations in the case of 4-year or 5-year course even after at least two more additional chances have been given to them, to the total number of students of the batches admitted to the first year of the course'. It has been stated that the 'partially refined rate of final wastage' is the closest approximation in estimate to an actual count of final wastage and, on an all-India basis, the wastage is:

(*a*) 15·6 per cent in the case of first degree institutions where the duration of course is four years and 19·3 per cent in the five-year degree course. This rate is considerably lower for students of Mechanical Engineering branch as compared to Civil and Electrical and other engineering branches.

(*b*) 28 per cent in polytechnics. It is 22·4 per cent in case of students in Mechanical Engineering branch, 28·3 per cent for the Electrical Engineering branch, and 33·5 per cent in case of the Civil Engineering branch.

6. In the draft Fourth Five-Year of Technical Education,[3] Sri L. S. Chandrakant has given figures of admission and output on an all-India basis and has taken the average output for the past 5 years at 79-80 per cent in the degree course and 55 per cent in diploma courses. According to this report, the wastage in degree courses is thus about 20 per cent and in diploma courses about 45 per cent.

7. A study on wastage was also undertaken by the Education Division of the Planning Commission†. The data collected covered information for the years 1958-59 to 1961-62 i.e. a period of 4 years. The report was not published but it was estimated therein that the wastage was about 24 per cent for degree courses and 50·3 per cent for diploma courses. In this study, 'wastage' was defined as the proportion of students in any one batch of admission who did not successfully complete their studies within the prescribed duration of the course. It was presumed that the number of students of the batches under study who did not pass within the prescribed minimum period, but passed later would be equal to the number of those students who passed in that year, but belonged to earlier batches and this difference between the number of students admitted in the batches under consideration and the number who passed out in the final examination held after 'n' years (n being the prescribed duration of the course) was taken as the number of students lost to the profession.

8. A similar study is reported to have been made by the Manpower Studies Division of the Directorate of Economics and Statistics of Madhya Pradesh on wastage in professional and technical education in Madhya Pradesh††, but restricted to institutions which had completed at least one full course by 1959-60. The percentage wastage during the course in first degree institutions of 4 years duration was estimated as 13 per cent and corresponding wastage in polytechnics was about 41 per cent.

Basis of present study

9. Although the extent of wastage as assessed in different studies has been varying, they all clearly indicate that the wastage is excessive and it is necessary to devise ways and methods to reduce this wastage. In order to assess the wastage in degree and diploma institutions in the State and the possible reasons therefor, information was collected from all institutions about the sanctioned intake, the actual admissions made and the number of students appearing and passing in the examination in different years. As the duration of degree courses was previously three or four years and is now four or

† Pages 136 and 142—Review of Engineering Educational Institutions in India[8].

††Original report was not available—Reference is made of it in the Review of Engineering Educational Institutions[8].

five years, information was sought for, starting from the batch admitted in 1958-59 so that complete information up to the end of the final year could be available for at least 3 batches. Of this, such information as was received complete, has been included in the Appendices. Those batches, the final year of which could not come up by 1965 have not been taken into consideration. The Madan Mohan Malviya Engineering College, Gorakhpur and the College of Agricultural Engineering at Pantnagar, both set up in 1962, have been excluded from this study as no batch reached the final year till 1965 in these institutions. For diploma courses, complete information up to the end of final year could be available for at least three batches, the duration of course being three years in case of majority of courses. For purpose of this study, follow up has been made of each batch admitted in first year up to its completion of the course and it has been presumed for the sake of convenience of calculations that the addition of the failures of previous batches who join a particular batch at various stages is more or less neutralised by the addition of similar failures of this batch to another batch admitted next and in future years and, therefore, such additions at various stages have been considered as a part of the particular batch itself for purpose of calculations. It has been stated in the Review of Engineering Educational Institutions in India† that an assumption of this nature is likely to over estimate the figure of wastage because of the increasing admission capacity year after year. This view seems to be correct to some extent, but it is felt that from an analysis based on this assumption it is atleast possible to get a picture of the out-turn of trained personnel in relation to the sanctioned admission capacity. It is also felt that it is a comparatively better estimate of the actual wastage than the figures arrived at by the 'partially refined rate of final wastage'. If the estimate of wastage tends to be on the higher side, this fact can be taken into account while assessing the seriousness of the situation.

10. It would appear from columns 3 and 4 of Appendices 2.1.1. to 2.9 for degree courses and of Appendices 3.1.1 to 3.6.3 for diploma courses that generally the seats in Civil, Electrical and Mechanical Engineering are filled up except sometimes in some specialised courses. There do seem, however, some drop-outs and this accounts for any difference between columns 3 and 4 in the Appendices. The overall wastage has been calculated as the percentage of (i) the difference between the sanctioned intake in first year and the number of boys passing out in respect of that batch at the end of the course in the Final year and (ii) of the sanctioned intake. While calculating the overall pass percentages, however, the figures of actual admissions have been taken into consideration. Further, since majority of institutions cater for courses in Civil, Electrical and Mechanical Engineering, averages have been worked out for these courses only but where even these courses have been common up to a certain stage and separate figures were not available, these have been considered together. For other courses such of the figures as were available have been taken into consideration.

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†Para. 194, page 144 of the Review[3].

Degree courses

11. To get complete information up to the end of Final year at least in respect of three batches, information was collected starting with the batches admitted in 1958-59 as already stated earlier. In the past, degree course used to be of 3 or 4 years duration. Now in a majority of cases, they are of 4 or 5 years duration. The Indian Institute of Technology, Kanpur started with a five year integrated course. Other institutions which have changed over to the five year courses are the colleges under the Banaras Hindu University and the Engineering College under the Muslim University, Aligarh. Overall wastage has been worked out in Appendix 2.10. The average overall wastage works out to 20 per cent. In case of Indian Institute of Technology, Kanpur, the higher wastage is partly because of the fact that eleven students of this batch dropped out during the five year period, which constitutes 11 per cent wastage for this batch of 100 admissions. Except for the University of Roorkee, Roorkee, where the wastage has been of the order of 6 per cent for courses in Civil, Electrical and Mechanical Engineering, wastage in other institutions has been near about the average figure of 20 per cent.† In case of Indian Institute of Technology, Kanpur and Motilal Nehru Regional Engineering College, Allahabad, figures were available for the first batch only. It did not have any failures of previous batches to partially neutralise the effect of failures and their figures have, therefore, tended to indicate the wastage very much on the higher side. It is felt that the wastage apart from other factors discussed later in general, is also due to lack of right quality of students. The general standard has gone down and a large number of students are such who have a poor grasping of fundamentals of the subjects taught in the qualifying examinations. Thus they fail to follow the lectures and gradually cease to evince interest in the course and some of them discontinue their studies.†† The wastage is, however, still higher for other courses where the average comes to 27 per cent for which less admissions and drop-outs at the initial stages are also partly responsible. There is a tendency amongst the boys to change over to the traditional type of courses, viz. Civil, Electrical and Mechanical Engineering if they are able to secure a seat even a little later (Appendix 2.6). The wastage figure is higher partly also because of this fact that the intake to these courses is small and even a failure of one student in an intake of 30 shows a wastage of 3 per cent.

† According to the Report of Education Commission (1964—66),—Chapter XV—Vocational, Technical and Engineering Education, para 15.58, page 38.

"The latest study shows an overall average rate of wastage at the degree level of around 20 per cent, rising in certain branches and years of study to as high as 44 per cent."

††Extract copy of letter no. 304/CT, dated 30th April, 1966 from the Principal, College of Technology, Banaras Hindu University, addressed to the Deputy Registrar, Academic of the University.

"In my opinion wastage is mainly due to lack of right quality of students. The standard of teaching has gone down and deteriorated to such an extent that the most of students admitted have a poor grasping of the fundamentals of the subjects taught in qualifying examinations. Thus they miserably fail to follow the lectures and gradually cease to witness interest in the course and discontinue their studies putting forward one or other excuses before their guardians

Diploma Courses

12. Starting from the batches admitted in 1960-61, detailed information of pass percentages and wastage is given institution-wise for courses in Civil, Electrical and Mechanical Engineering in diploma institutions affiliated to the Board of Technical Education, U. P. (referred to as the Board in Appendices 3.1.1 to 3.1.3). Similar information about other courses is given in Appendices 3.2 to 3.4. Information about diploma courses in University Polytechnic, Muslim University, Aligarh and Diploma Polytechnic, Roorkee University, Roorkee is given in Appendices 3.5.1 to 3.5.3 and 3.6.1 to 3.6.3. The average rate of wastage after taking into account, the institutions affiliated to the Board and the University Polytechnic, Muslim University, Aligarh has come to 55 per cent (Average of 58+53) for Civil Engineering, 41 per cent (Average of 43+39) for Electrical Engineering and 27 per cent (Average of 30+25) for Mechanical Engineering. The overall average rate of wastage comes to 41 per cent.† This is almost of the same level as was estimated in Madhya Pradesh[8] and also indicated in the Draft Fourth Five-Year Plan[3]. The wastage is even much greater for part-time courses where a larger number of students leave the institution after joining. The figures of wastage in the Diploma Polytechnic at Roorkee are lower. These are 17 per cent for Civil Engineering, 16 per cent for Electrical Engineering and 9 per cent for Mechanical Engineering but since diploma courses have been abolished in the Roorkee University since 1964, these figures have not been added to work out the overall averages. It is, however, beyond doubt that average rate of wastage has been considerably lower at the Diploma Polytechnic, Roorkee University, Roorkee and one of the main reasons for this has been that number of drop-outs in the Roorkee University Polytechnic has been more or less negligible at all stages. Perhaps the advantage of having the best facilities of laboratories, equipment, staff and teaching methods, it being the oldest University in the State, and its residential character had also largely to do with its much better results.

13. This overall wastage does not constitute entirely of failures. There are a number of other causes of this wastage as already mentioned earlier in para 3. These are now analysed below :—

(1) *Wastage on account of seats remaining unfilled*—As stated in para 10, almost all the seats are filled up in Civil, Electrical and Mechanical Engineering courses in the initial stages but there do seem some drop-outs also in the earlier part of the session itself.

(2) *Wastage on account of poor quality of students being admitted*—

(i) The admission in all diploma institutions affiliated to the Board is made on merit basis. No candidate with less than 45 per cent marks in Science and Mathematics is eligible for admission except in certain

† According to the Report of Education Commission (1964-66), Chapter XV, Vocational, Technical and Engineering Education, para 15.21, page 16.

"Various studies on this last point have, for different periods, shown overall range of wastage rates in diploma courses varying between 35.6 per cent and 50 per cent."

courses such as Printing Technology and in certain reserved seats and this forms the lowest category of admissions. A study of the figures of admissions in 1960-61, 1961-62 and 1962-63 in first year in Civil, Electrical and Mechanical Engineering shows that about 33 per cent of the total admissions were from XIth† category (Table 10).

TABLE 10

(Showing total admissions made in first year and admissions made from XIth category)

Serial no.	Year of admission	Total admissions made	Admissions made from XIth category	Percentage $\left(\frac{4}{3} \times 100\right)$
1	2	3	4	5
1	1960-61	1849	602	32
2	1961-62	1993	705	35
3	1962-63	2563	815	32

NOTES—(1) Figures in col. 4 are taken from Table 11.

(2) Figures in col. 3 are taken from col. 4 of Appendices 3.1.1, 3.1.2 and 3.1.3.

(ii) The students of XIth category admitted during 1960-61, 1961-62 and 1962-63 were further sub-divided into three groups as follows :—

(*a*) Those obtaining 45—50 per cent marks in High School ;

(*b*) Those obtaining marks between 50—55 per cent in High School ;

(*c*) Those obtaining marks above 55 per cent but below 60 per cent in High School ;

and a further study was made of the incidence of failures within these three groups. Table 11 shows that percentage of failures increased as the quality of the students admitted on the basis of the marks obtained by them in the High School Examination went down. This shows that the admission of lower grade of students had all along been having an adverse effect on the examination results.

†XIth category covered those boys who were only High School pass but had an aggregate of more than 45 per cent and less than 60 per cent

TABLE 11

(Showing the percentage of failures in the three groups under category XIth)

Serial no.	The three different groups in Category XI	Name of Course	1960-61			1961-62			1962-63			Average of columns 6, 9 and 12 taken together
			Admitted	Failed	Percentage of failures	Admitted	Failed	Percentage of failures	Admitted	Failed	Percentage of failures	
1	2	3	4	5	6	7	8	9	10	11	12	13
1	Those obtaining marks between 45—50 per cent in High School.	Civil Engg.	271	134	..	273	163	..	360	200	..	..
		Elect. Engg.	33	21	..	32	20	..	43	30	..	..
		Mech. Engg.	27	12	..	16	13	..	35	16	..	..
		Total ..	331	170	51	321	195	61	438	306	68	60
2	Those obtaining marks between 50—55 per cent in High School.	Civil Engg.	121	45	..	168	62	..	170	69	..	..
		Elect. Engg.	37	29	..	67	38	..	66	37	..	..
		Mech. Engg.	15	4	..	17	6	..	20	12	..	..
		Total ..	173	78	45	252	106	42	256	118	46	44
3	Those obtaining marks between 55—60 per cent in High School.	Civil Engg.	81	20	..	75	29	..	81	26	..	..
		Elect. Engg.	14	4	..	42	4	..	32	5	..	..
		Mech. Engg.	3	1	..	15	2	..	8	2	..	..
		Total ..	98	25	25	132	35	26	121	33	27	26

NOTE—This includes information of all institutions affiliated to the Board, except Allahabad Polytechnic, Allahabad, information of which was not received.

(iii) A separate study was also made of failures amongst the Scheduled castes students who took admission in the sessions 1961-62, 1962-63, 1963-64 and 1964-65 in Civil, Electrical and Mechanical Engineering against reserved seats in various institutions affiliated to the Board. Table 12 shows that their average pass percentage was 47 per cent and the percentage of wastage was as high as 60 per cent which is much higher than the average rate of overall wastage of 41 per cent and it means that this has also been a factor in increasing the figure overall percentage of wastage.

TABLE 12

(Showing position of Scheduled Castes candidates joining and passing the first year)

Serial no.	Session	Total Admission	Number of students who appeared in the examination	Total number of students passing	Pass percentage 5 (—× 100) 4	Percentage failures 4—5 (——× 100) 4	Percentage Wastage 3—5 (——×100) 3
1	2	3	4	5	6	7	8
1	1961-62	89	72	35	47	53	68
2	1962-63	74	63	25	40	60	66
3	1963-64	107	93	56	58	42	48
4	1964-65	151	142	61	43	57	59
	Total	421	373	177	47	53	60

(iv) It has been the common experience that the best boys are generally attracted towards Mechanical Engineering and boys of lesser calibre have to accept Electrical Engineering. The remaining boys accept Civil Engineering and this is the reason why the incidence of failures is maximum in Civil Engineering, much less in Electrical Engineering and least in Mechanical Engineering. Table 11 also shows that most of the boys of XIth category were able to secure a seat in Civil Engineering course only.

(v) No specific data was available about the University Polytechnic, Muslim University, Aligarh for making a similar analysis. It is, however, believed that the facts discussed in this para are equally applicable to this Polytechnic also.

(3) *Wastage on account of discontinuation of studies*—Information was collected from all institutions about students leaving the institution in the middle of the course on account of one or more of following reasons:

(*a*) On account of sickness,

(*b*) On account of economic conditions,

(*c*) On account of not being able to pull on with the course,

(*d*) For other reasons,

(*e*) Detained from appearing in the examination as per rules :

It has been difficult to exactly locate the reason of discontinuation of studies in each case since no student specifically indicates any such reason for leaving the course and also since no separate records are maintained in the

institutions from this point of view. The institutions were, however, requested to prepare this information on the basis of whatever records they had and on the basis of their long experience and personal contact with the students. There is, however, bound to be some inaccuracy in an analysis of this type but all the same it does give an indication of the state of affairs. Table 13 shows that about 11 per cent wastage is on account of the students leaving the institutions in first year for one reason or the other. The remaining 30 per cent is on account of failure in First, Second and Final year and on account of drop-outs and detentions in Second and Final year.

TABLE 13

(Showing number of students leaving the institutions during the session for one reason or the other)

Serial no.	Session	Total admitted	Left Institution during the session								Detained from appearing at the examination according to the Rules of the Board		Total	Percentage	Total no. appeared
			On account of sickness		On account of economic condition		On account of not being able to pull on with course		For other reasons						
			Total	Against reserved vacancies only	Total	Against reserved vacancies only	Total	Against reserved vacancies only	Total	Against reserved vacancies only	Total	Against reserved vacancies only			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1960-61	1784	2	.	56	3	42	4	41	5	53	6	217	12	1565
2	1961-62	1982	20	..	10	3	18	4	90	6	43	14	211	11	1729
3	1962-63	2451	8	..	24	8	24	2	119	13	66	7	271	11	2156

NOTE—(1) Information in respect of Allahabad Polytechnic, Allahabad was not received.

(2) The total of columns 3 and 14 does not tally with column 16. This difference is perhaps due to the fact that some students who left the institutions remained unaccounted for.

14. Apart from these factors which directly contribute to wastage, lack of adequate facilities of staff, workshops and laboratories in an institution may indirectly contribute to wastage.

(i) For this purpose, results of different institutions below 60 per cent, 70 per cent and 80 per cent in first, second and final year respectively were taken into consideration. Appendix 4 indicates that some of the institutions had more or less uniformly shown average or poor results in first year :

(ii) Results of some of the institutions had also been poor in Second and Third year. Most of these institutions did not have full facilities for some years and some of these not-so-well equipped institutions added more to the figures of failures. In some other institutions, the results have not been so good in the Civil Engineering branch. One of the reasons for poor result in Civil Engineering is also the fact that usually in order of preference the lowest in merit join the Civil Engineering course.

(iii) Shortage of technical teachers has also been another factor responsible for certain wastage as the students are not able to get the best training in such subjects. A report of the study of shortage of teachers as in December 1963 is given in the draft report of the Fourth Five-Year Plan of Technical Education on an all-India basis[3]. For purpose of study, the degree and diploma institutions were divided into three categories as they were in 1963 viz. (*a*) those institutions from which the first batch had already passed and were at least five years old; (*b*) those institutions from which the first batch was about to pass and were generally four to five years old and (*c*) those institutions which had been set up recently and were less than four year old. The staff shortage at that time on an all-India basis in degree courses is reported to be 26·8 per cent for first category, 48·4 per cent for second category and 64.4 per cent for the third category, giving an average of 38.9 per cent. In diploma polytechnics, the figures reported are 22·7 per cent for first category, 36.4 per cent for second category and 69.7 per cent for third category on an all-India basis, giving an average of 31.2 per cent. The figures reported for U. P. are 50.3 per cent for first category and 61.5 per cent for third category for degree courses. At the diploma level the figures reported are 25.4 per cent for first category and 72.2 per cent for third category. This heavy shortage of staff must have adversely affected the teaching of students thereby causing poor results. The staff position has now gradually improved. Even today, however, the shortage of instructional staff is about 28 per cent in degree institutions. In diploma institutions it is about 14 per cent in polytechnics offering courses in Civil, Electrical and Mechanical Engineering and about 30 per cent in institutions offering other courses. For purpose of this study, all technical staff up to the level of instructors has been taken into consideration as on March 1, 1966. Institution-wise details are shown in Appendices 5 and 6. Apart from the question of actual number of instructional staff, the quality of staff available to the institutions is also important. During the last ten years there has been considerable expansion of facilities with the result that there has not only been frequent changes amongst the teaching staff but there has also been dearth of experienced staff to occupy senior positions. These frequent changes which upset smooth teaching schedule, also prevent the teacher from really giving of his best and develop-

ing that personal contact and relationship with his students which is a prerequisite to successful teaching.

15. It has been observed in the preliminary report of wastage in technical education that 'wastage during the first year accounts for a substantial proportion of the total wastage'. This is confirmed by the present study in respect of degree as well as diploma institutions. Further, calculated in terms of number of students, the wastage at the rate of 20 per cent, works out to a student body of 290 per year at the degree level, with the present intake of 1,490 (Appendix 7—column 16) for Civil, Electrical and Mechanical Engineering courses alone. Similarly at the diploma level, the wastage in terms of number of students works out to 1,730 at the average rate of wastage of 41 per cent for courses in Civil, Electrical and Mechanical Engineering with an intake of 4,710 in 1965-66 (Appendix 1.2). This shows the magnitude of the problem and it is so not only in this State but it is nearly at the same level on an all-India basis. It is, therefore, necessary to do every thing that is possible to ultimately reduce this wastage to at least 10 per cent for degree courses and 20 per cent for diploma courses and also to improve the quality of training.

CHAPTER III

SOME SUGGESTIONS

Introduction

In Chapter I, it has been discussed in detail as to how technical education has developed in this State during the last eighteen years. In Chapter II, the problem of wastage has been discussed. For the advancement of Technical Education on correct lines, it is necessary to constantly assess the effectiveness and utility of the programmes and policies persued and to modify or change the policies and programmes according to the future need and in the context of the rapidly advancing technology. The limitations, however, of making any such changes have also to be clearly realised on account of the large number of factors involved in effecting the changes and also in the possible disadvantages resulting therefrom. In this chapter, some of the problems facing development of technical education have been discussed and an attempt has also been made to suggest measures which may be considered for implementation.

1. *Medium of Instruction*

The medium of instruction and examination for degree and diploma courses is at present English. There was no difficulty in the old days when English used to be the medium of instruction and examination in High School and Intermediate examinations also. But with the change over to Hindi in High School and Intermediate in this State and similarly to a regional language in some other states, students find it difficult to understand and express themselves in the English language in diploma and degree courses. Students of average ability find it still more difficult and this has an adverse effect on their capacity to carry on with the course satisfactorily. In the First year, therefore, the boys mostly fail to settle down to the changed medium.† This is also reflected in the greatest incidence of failures in the first year examination both at the degree and the diploma level. For various reasons, however, it had not so far been considered desirable to change the medium of instruction and examination from English to a regional language. Undoubtedly there are a number of difficulties in changing over to a regional language. The difficulty is still greater in case of degree courses than in case of diploma courses. It is from amongst those who persue a degree course that designers and research workers are produced and for all advanced knowledge and com-

†Extract of letter no 99, dated April 7, 1966 from the Principal, University Polytechnic, Muslim University, Aligarh.

"Most of the students admitted come from where at the High School and Intermediate colleges, the medium of instruction and examination is mostly Hindi. At the polytechnics, the medium is English. In the first year classes therefore, the boys mostly fail to settle down to the changed language. This is reflected in the greatest incidence of wastage at the 1st year examination."

munication, they have to depend mainly on English language. Then there is inter-state mobility also amongst degree holders and great difficulty would be experienced in expressing and understanding each other if the entire teaching is done in a regional language. Non-availability of technical books and literature in regional languages is another great handicap. Most of these difficulties hold true for diploma courses also though to a lesser extent. But in case of diploma courses where the minimum qualification is High School pass, the English medium of instruction undoubtedly places them in difficulty as these boys are mostly unable to understand and express themselves in English. Apart, therefore, from further strengthening the background of English in High School and Intermediate classes, it is necessary to consider how soon it could be possible to change over to Hindi in this State at the diploma level. The Education Commission has recommended that at the secondary stage and at the polytechnic stage, the regional language should be the medium of instruction[12]. Till this is done, it may be desirable to permit the answering of questions through the medium of Hindi with technical words in English as an alternative to the English medium at the diploma level where the inter-state mobility is much less than what it is amongst degree holders.† Perhaps this partial change over to Hindi could be tried as an experiment without any serious disadvantage. At the degree level, however, English should continue as the medium of instruction and examination for some years and, therefore, efforts should be made in the first year to strengthen the student's capacity of understanding and expression in English.

2. *Lack of Text Books*

Although technical education has expanded considerably during the last eighteen years, yet not many good books have appeared in the market which could be used as text books. This is particularly true for diploma courses. Individual efforts that have been made in some cases have not so far produced the desired results. It is now necessary that an organised effort is made in this direction so that good text-books on almost all engineering subjects are made available to the students both at the degree as well as diploma level. Efforts should also be made to bring out these books in regional languages. Some pioneering work is already being done in this direction under the auspices of the Roorkee University. The Ministry of Education, Government of India have set up a 'Standing Commission for Scientific and Technical Terminology' to suggest such equivalents of scientific and technical words which could be adopted in regional languages. A few regional language or text book institutes may be set up in four or five places in the country to exclusively look after the work of text-books[4]. If possible separate funds may be allotted for getting text-books written by experts in their own fields of specialisation. Such experts may be approached to write text-books and for which they may be paid adequate

†In Gujarat, students of Diploma courses are permitted to answer in Gujarati as an alternative medium at the examinations, if they so desired—Letter no. REQ/1066/KH/53222/51126, dated 22-7-'66 from the Director of Technical Education, Ahmadabad addressed to the Board of Technical Education, U. P.

remuneration. Even if one book is written on each subject in a period of two years, there can be a hope of expecting good text-books in the market at least in a period of five years. This method may be considered more necessary at least for such subjects in which books may not at all be available in the market.

3. *More intensive training and individual attention to weaker group of students of first year.*

It is obvious that the wastage is highest in the first year both at the degree and diploma level. In order to reduce larger failures and drop-outs amongst the weaker group of students, some scheme of extra coaching and tutorial classes over and above the normal periods prescribed in the curriculum should be introduced for giving them more individual attention and to enable them to catch up with other students. This is particularly necessary for students admitted against reserved seats. It might also be worth while trying that as far as possible some of the classes in first year may be taken by senior members of the staff as the impact of senior and experienced staff is likely to be much greater on the students.

4. *Teacher—student ratio and strengthening of tutorial systems*

The All-India Council for Technical Education, Government of India have laid down certain norms for workload of Professors, Readers, Senior Lecturers, Demonstrators and Instructors. It is necessary to assess the extent to which it is possible to reduce wastage and improve quality by increasing tutorials and thus giving more individual attention to students. It may then be found desirable to increase the staff strength and reduce the teacher—student ratio particularly in the first year.

5. *System of Examination*

The present system of examination is always criticised as a major evil, yet it has not so far been possible to change this system in this country. There is usually a tension on the students at the time of examination[4]. This is admittedly not very satisfactory. Objective testing is considered to be a better method of examining a student's ability and attainment. It may be worth while introducing this way of examination in stages. Semester system is in vogue in I. I. T., Kanpur and has also been introduced at the Roorkee University, Roorkee. Importance of class tests has already been recognised in other institutions also through a system of sessional marks. This may be extended further. Unfortunately, however, even this arrangement is not free from faults. There is sometimes a tendency to boost up the sessional awards. Any changes have, therefore, to be gradual, selective and with great care.

6. *Redrafting of courses*

In the context of the need of close collaboration and co-operation with industry it is imperative that the existing courses which are very much insti-

tution based should be given a second look. In the old days, the Public Works Department was the main employer of engineering personnel and the pattern of courses that emerged was also based on the then existing need. Now industry has come up as a large scale employer and in future, the shift will be gradually towards more employment in industry. The future engineer and technician should, therefore, be a product not only readily adaptable to the requirements of the industry, he should be able in course of time to take effective part in the efforts of the country to generate its own technology. The Education Commission have recommended that while a strong Science base is needed by engineers, production experience should be an integral part of the curriculum[12] (and this is particularly important in the context of our present needs). At the degree level, each engineering college has its own independent syllabus consistent with the general standard required of a degree course and such modifications as are considered necessary and possible to meet the above need should be made. At the diploma level, however, it may not be possible to allow each institution to have its independent syllabi and curriculum but it may still be possible to allow controlled flexibility within the curriculum with a view to meet not only the immediate needs of the industry but also the challenge of rapid advancements in technology.

7. *Quality along with quantity and faculty development.*

Generally in an expanding situation the emphasis is on numbers and with this objective the quality is bound to suffer, however, conscious of it one may be. A stage has now reached when along with quantity, it is most essential to assess : (i) the quality of degree and diploma holders that are being turned out and also (ii) the steps required to be taken to further improve their quality. Physical requirements of staff, buildings and equipment for any technical institution have more or less been taken care of so far but along with it what is now essential is a constant appraisal of the academic development. Teachers training, refresher courses, summer school programmes, training of teachers in industry are some of the ways in which a teacher can be equipped to improve upon his quality of teaching. It is understood that the Government of India are considering a scheme of direct exposure of teachers to industry. In this scheme it is proposed to send teachers to work in industry for a period of a year or so and when they would come back to the institution, they would be acquainted with the existing requirements of industry and also their changing needs. They would also be improving upon their own technical knowledge in this way. Syllabus and curriculum should be reviewed from time to time to make it more practical oriented and suitable to the need of the advancing technology. As discussed later, the service condition of teachers should be improved as amongst the three physical requirements, it is the quality of staff that in the final analysis makes for the success of an institution[3]. Quality of teachers is, therefore, very important and the same can only improve when the service conditions are made attractive. Facilities of academic persuit should also be created in the institutions.

8. *Teaching Materials and Aids*

Apart from the facilities of equipment, buildings and staff, other facilities such as a good library, a spacious reading-room, audio-visual aids and a hobby centre are also important from the point of good technical education. A hobby centre enables a student to develop in him creative thinking. A good library is a great asset by itself. If it has the additional facility for the students to sit and study it gives them the atmosphere and environment of study. In almost all advanced countries, apart from the University and College and Departmental libraries, there are many public libraries which provide these facilities. Under audio-visual aids, the use of educational films, charts, diagrams, tape-recorded lectures and working models should be encouraged. These are very helpful in explaining many of the complicated principles, which are otherwise difficult to understand.

9. *Selection for admission*

Since much of the success of training depends on the quality of students admitted to the course, it should always be an important consideration as how to select the right type of students. It is argued that a student who is able to secure the highest marks in a qualifying examination is not necessarily always the best student and, therefore, selection strictly on merit, based on the marks in the qualifying examination is not always the best method of selection. It is pointed out that the method leaves no scope for assessing the aptitude of a student or for assessing the suitability of a student for the course he wishes to pursue. It may be that some of the students who have done well in their examination, turn out complete misfits for technical education. There may, on the other hand, be some others who may be found eminently suited to technical training, yet they have not been able to do quite so well in their qualifying examinations. It has, therefore, been suggested that some sort of interview or viva should also be held for selection of students. It is, however, equally difficult to assess correctly this aptitude or suitability of a student by interview or viva and in the absence of any other better method, selection is made on the basis of merit alone in majority of institutions. But this basis of merit is also decided in diverse ways and there are merits and demerits of each such basis. There is also a view that experts from industry should be associated in selecting the students. It is, therefore, necessary that this problem is reviewed as a whole from time to time to see if it is possible to evolve methods by which still better selections can be made.

10. *Lack of financial resources*

The minimum expenditure in a diploma institution comes to about Rs.120 per mensem and that in a degree institution it comes to about Rs.200 per mensem. Even for middle income group families, it becomes too difficult to meet such an expenditure for even one student. Efforts should be made by the State that no meritorious student is allowed

to discontinue his studies or discouraged to join a technical course for lack of financial resources and that every meritorious student should fully know that if he is selected for a course, financial difficulty would not come in his way in pursuing the studies. Although the situation has very much improved in this regard as a large number of merit-*cum*-means scholarships, stipends and loan facilities have been made available now, yet many meritorious but poor students who are eager to pursue a course of engineering are still prevented from taking their chance or continuing with their studies on account of financial difficulties. In the Fourth Five-Year Plan, a new scheme of providing scholarship facilities has been introduced. It is hoped that if their availability is well notified and facilities made available well in time, the wastage on account of financial difficulties could be largely overcome.

11. *Effective utilisation of part-time courses*

The scheme can only work with the active co-operation of educational authorities and the employing organisations. In no advanced countries in the West, which are quoted so often, these schemes are running merely on the initiative of education authorities. It has to be realised by the Government departments and the Industrial organisations that the scheme is important for the advancement of the industry itself and has to be given all encouragement. The outlook has to be, that while one of their employee is pursuing a part-time course, he is doing as much service to the organisation as he is doing to himself. All possible facilities should, therefore, be extended by the employers. Transfer of an employee should be avoided during the course of his part-time study so that his study is not discontinued in the middle. Such leave and day-release (full day or part day) as may be necessary and feasible should be allowed. At present a number of boys leave their studies after some time for lack of these facilities. Incentives should be provided to those employees who improve their professional qualification in this way. Facilities for part-time degree courses have not so far been created while they exist in two institutions only for the diploma courses. It is necessary that further facilities at both the levels are provided. Depending upon the demand for such a course in a particular place and after taking into account the training facilities available in an institution, part-time courses may be run on a limited scale in different institutions. It has been recommended in the Draft Fourth Five-Year Plan[3] that the aim should be to train about 10 per cent of the demand for graduate engineers and diploma technicians through part-time courses.

12. *New institutions near industrial areas*

In the past, the planners used to take pride in saying that the ultimate objective is to have one polytechnic in each district. It has been generally realised by now that from the point of view of location of a technical institution, particularly a polytechnic, it is not correct to think in terms of districts. What is now necessary is that a polytechnic should be able to have close collaboration with some industrial undertaking in the

vicinity and, therefore, every new polytechnic should be set up in an area and at a place where an industrial complex already exists or is proposed to be created.† That would greatly help the institute in getting practical training facilities, teachers for specialised subjects on part-time basis and in formulation of specialised courses and employment of trained students. On the other hand, the institute can also organise short-term refresher courses for persons from industry, create facilities for part-time courses and conduct experimental work to meet the special needs of the industry. Sandwich type of courses can also be organised if a polytechnic is located near an industrial area.

13. *Diversification of courses*

Both at the degree and at the diploma levels, all the emphasis has so far been on the traditional type of courses, viz. Civil, Electrical and Mechanical Engineering. The future industrial development of the country has to be towards the manufacture of heavy machines, machine tools, electrical and electronic equipment and electrical goods, more fertilizers and towards chemical industries. There would thus be a definite shift in demand of technical personnel. Civil Engineers, both at the degree and diploma level, may not be needed in very large numbers whereas there would be increasing demand for Electrical and Mechanical Engineers. Tele Communication and Electronic Engineers, Chemical Engineers, Air-Conditioning and Refrigeration Engineers, Automobile Engineers, Chemical Technologists, Metallurgists and those trained in many new specialities. The cloth made of synthetic fibre is fast replacing the traditional cotton textiles and industries manufacturing synthetic wool and fibre including artificial silk have to come up in large numbers. There may be demand for specialists in this field. New types of courses should, therefore, also be introduced considering the future need of the State. The Education Commission has recommended that in order to relate the courses—degree and diploma—to the varying type of engineers and technicians required by industry, it is necessary to change the traditional pattern and diversify courses in the existing and new institutions to produce the needed technical personnel[12].

14. *Facilities to teachers*

It has been stated in Chapter II that there has all along been dearth of qualified and experienced teachers in technical institutions both at the degree and diploma level, although in terms of numbers, the position has gradually improved. The basic reason has been that till recently, no graduate or diploma-holder in engineering would consider the teaching profession at all lucrative when compared to the engineering services. In the past a talented person would join the teaching profession only if he had a very strong aptitude for it and he was ready to forgo other facilities.

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†According to the report of the Education Commission (1964—66), Chapter XV, Vocational, Technical and Engineering Education, para 15.24, page 17.

"Polytechnics should be located only in industrial areas, industrial estates or areas specifically designated for development of industrial locations."

Others would take to the teaching profession if they did not get opportunities elsewhere. There was a third category in which people would join as a stop gap arrangement and leave the teaching profession as soon as a better service was available. Except in institutions like the Roorkee University and the Colleges under the Banaras and Aligarh University, neither the pay scales nor the service conditions were attractive. The condition was still worse in diploma institutions. The result was that there were institutions with even 50—60 per cent posts vacant almost all along the academic year. The position is, however, changing since the last few years, when pay scales have been revised and a consciousness has been created by the Ministry of Education, Government of India about the need for recognition of this class of personnel. In the changed circumstances, therefore, the position has improved at least in number of personnel joining the teaching profession but the urge to find a higher position immediately after joining is still very great. This is reflected in the incidence of frequent changes on the same post. There are still a number of matters to which attention has to be given not only to get the best talents for the teaching profession and to retain them but also to improve the academic quality of the institutions. A few of these are:

(1) The pay scales should decidedly be better than those offered in engineering services for equivalent qualification and experience.

(2) In Government Institutions, the posts should be made permanent as the institutions have to continue and are not likely to be abolished.

(3) There should be sufficient provision for promotion from a lower scale to a higher scale subject to the fulfilment of the requisite minimum qualification. The service conditions should be well defined. A unified service cadre should be evolved.

(4) Residential facilities should be provided particularly in such institutions which are not located in or near cities.

(5) Opportunities should be provided to teachers for their further training in India and also to a limited extent abroad. Facilities of study leave should be liberally allowed to those who wish to pursue a higher course of study provided they have put in a minimum number of years of service in an institution.

(6) Incentives should be provided in the shape of some allowance to those who acquire higher academic or professional qualification.

15. *Opportunities to learn and earn while studying*

In order to provide opportunity to the students to do some productive jobs and thus create in them an awareness of working on the shop floor, it may be worth while to set up a co-operative industrial unit near a polytechnic on an experimental basis. Also in the institute itself, some productive jobs including fabrication of simple equipment could be undertaken. This is likely to develop skill and create a confidence amongst the students as

well as amongst the staff and also reduce the cost of the equipment. This may be tried on experimental basis to see if it is workable and also if such an arrangement does not adversely affect the teaching programme.

16. *Technical Education Administration*

In order to provide unified administrative control at the Government level, a separate Department of Technical Education has already been set up in 1965 and all work relating to technical education at the diploma level and above is entrusted to this Department with an independent Secretary[6]. Excluding the colleges under Universities at Banaras and Aligarh, the University of Roorkee and the degree engineering colleges are directly administered by the State Government. The degree institutions are autonomous in character except the Government Central Textile Institute at Kanpur. These institutions regulate their academic programme in their own way subject to the directives of the All-India Council for Technical Education, Government of India, the University Grants Commission and the State Universities to which the degree engineering colleges are affiliated. Almost all the diploma level institutions and the Government Central Textile Institute at Kanpur are under the Directorate of Technical Education. The Directorate is also concerned with the planning of courses of study and co-ordination of development at the degree level institutions. In order to enable the Directorate to do regular inspection of diploma institutions, a panel of experts can be associated with the Directorate to assist it in such inspections apart from its own staff doing this work independently.

APPENDICES

Details of Appendices

APPENDIX

1.1. Showing intake at the degree level in 1947 in the beginning and at the end of each Plan.

1.2. Showing intake at the diploma level in 1947 and in the beginning and at the end of each Plan.

2.1.1. Showing position of wastage in Civil Engineering course at the Roorkee University, Roorkee.

2.1.2. Showing position of wastage in Electrical Engineering course at the Roorkee University, Roorkee.

2.1.3. Showing position of wastage in Mechanical Engineering course at the Roorkee University, Roorkee.

2.1.4. Showing position of wastage in Tele-Communication Engineering course at the Roorkee University, Roorkee.

2.1.5. Showing position of wastage in Architecture course at the Roorkee University, Roorkee.

2.2.1. Showing position of wastage in Chemical Engineering course at the H. B. Technological Institute, Kanpur.

2.2.2. Showing position of wastage in Chemical Technology course at the H. B. Technological Institute, Kanpur.

2.3.1. Showing position of wastage in Mining course at the College of Mining and Metallurgy, Banaras Hindu University, Varanasi.

2.3.2. Showing position of wastage in Metallurgical Engineering course at the College of Mining and Metallurgy, Banaras Hindu University, Varanasi.

2.3.3. Showing position of wastage in Chemical Engineering course at the College of Chemical Engineering and Technology, Banaras Hindu University, Varanasi.

2.3.4. Showing position of wastage in Civil, Electrical and Mechanical Engineering courses taken together at the Engineering College, Banaras Hindu University, Varanasi.

2.4. Showing position of wastage in Civil, Electrical and Mechanical Engineering courses taken together at the College of Engineering and Technology, Muslim University, Aligarh.

2.5. Showing position of wastage in Electrical and Mechanical Engigineering courses taken together at the Engineering College, Dayalbagh, Agra.

2.6. Showing position of wastage in Textile Technology and Textile Chemistry courses taken together at the Government Central Textile Institute, Kanpur.

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2.7. Showing position of wastage in Agricultural Engineering course at the Allahabad Agriculture Institute, Allahabad.

2.8. Showing position of wastage in Civil, Electrical, Mechanical, Chemical, Metallurgical and Aeronautical Engineering courses, taken together at the Indian Institute of Technology, Kanpur.

2.9. Showing position of wastage in Civil, Electrical and Mechanical Engineering courses taken together at the Motilal Nehru Engineering College, Allahabad.

2.10. Showing overall position of wastage in degree courses.

3.1.1. Showing position of pass percentage and wastage in Civil Engineering course in diploma institutions affiliated to the Board.

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3.2. Showing position of wastage in Leather Technology (Tanning) course at the Government Leather Institute, Kanpur.

3.3. Showing position of wastage in Textile Technology and Textile Chemistry courses taken together at the Government Central Textile Institute, Kanpur.

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3.6.1. Showing position of wastage in the diploma course in Civil Engineering at the Diploma Polytechnic, University of Roorkee, Roorkee.

3.6.2. Showing position of wastage in the diploma course in Electrical Engineering at the Diploma Polytechnic, University of Roorkee, Roorkee.

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3.6.3. Showing position of wastage in the diploma course in Mechanical Engineering at the Diploma Polytechnic, University of Roorkee, Roorkee.

4. Showing analysis of results institution-wise covering diploma institutions in which the result was less than 60 per cent, 70 per cent and 80 per cent in first, second and final year respectively in any year.

5. Showing shortage of staff in degree institutions.

6. Showing shortage of staff in diploma institutions.

7. Showing admission capacity in degree courses at the end of the Third Plan (1965-66).

8. Showing details of facilities at the diploma level in the State in Civil, Electrical and Mechanical Engineering from 1960-61 to 1965-66.

9. Showing intake for various degree courses during the Third Plan.

10.1. Showing annual admission capacity approved in the Third Plan vis-a-vis facilities provided in the States by 1965-66: Degree courses—All-India position.

10.2. Showing annual admission capacity approved in the Third Plan visa-vis facilities provided in the States by 1965-66: Diploma courses—All-India position.

APPENDIX 1.1

(SHOWING INTAKE AT THE DEGREE LEVEL IN 1947 IN THE BEGINNING AND AT THE END OF EACH PLAN)

Name of Institute	1947	1951-52	1955-56	1956-57	1960-61	1961-62	1965-66	1966-67
1	2	3	4	5	6	7	8	9
1. Roorkee University, Roorkee.	80	80	100	120	300	300	510†	585†
2. College of Technology, Banaras Hindu University, Varanasi.	148	142	120	82	82	82	112	112
College of Engineering, Banaras Hindu University, Varanasi.	120	160	160	160	270	270††	350††	350††
College of Mining and Metallurgy, (Mining) and Metallurgy) Banaras Hindu University, Varanasi.	48	48	48	90	100	100	100††	100††
3. Engineering College, Muslim University, Aligarh.	90	90	90	90	120	120	240†††	240†††
4. H. B. Technological Institute, Kanpur.	27	16	16	16	38	38	185	395
5. Allahabad Agricultural Institute, Allahabad.	15	30	30	30	30	40	40	40

† Contains 90 seats of 3 years' degree course after B. Sc.

†† Relate to admissions in II year of the Five-year integrated course.

††† Additions, if any, are not known.

1	2	3	4	5	6	7	8	9
6. Engineering College, Dayalbagh, Agra.	..	60	60	60	60	60	60	70
7. Government Central Textile Institute, Kanpur.	..	..	..	..	30	30	30	30
8. Indian Institute of Technology, Kanpur.	..	..	..	..	100	100	300	300
9. Moti Lal Nehru Engineering College, Allahabad.	..	..	..	..	..	100	250	250
10. Madan Mohan Malviya Engineering College, Gorakhpur.	..	..	..	..	..	..	120†	210
11. U. P. Agriculture University, College of Agriculture Engineering and Technology, Pantnagar.	..	..	..	..	..	..	75	75
12. Engineering College at Pantnagar.	..	..	..	..	..	..	..	150
Total	528	626	624	648	1130	1240	2402	2907

†Only 60 admissions were made.

APPENDIX 1.2

(SHOWING IN TAKE AT THE DIPLOMA LEVEL IN 1947 AND IN THE BEGINNING AND AT THE END OF EACH PLAN)

Present name of the Institute with year of establishment	1947	1951-52	1955-56	1956-57	1960-61	1961-62	1965-66	1966-67
1	2	3	4	5	6	7	8	9
1. Government Polytechnic, Lucknow, (1892).	40	40	40	40	210	240	300	300
2. Hewett Polytechnic, Lucknow (1904).	120	225	330	300	120	120	240	300
3. Government Polytechnic, Gorakhpur. (1909).	40	40	40	40	200	240	300	300
4. P. M. V. Polytechnic, Mathura (1909).	30	30	40	40	120	120	180	180
5. Lucknow Polytechnic, Lucknow (1922).	90	120	340	340	120	120	240	240
6. Technical College Dayalbagh, Agra (1927).	40	30	40	40	90	90	120	150
7. Government Technical Institute, Jhansi.	12	12	12	(The institute was transferred to Railway Administration in 1958).				
8. I. D. Technical Institute, Bahjoi (Diploma courses started in 1949).	..	0	40	40	(Diploma classes closed down in 1959).			
9. Engineering Vocatitional School, Lucknow, (1954).	..	..	..	50	(Diploma clases closed in 1959)			

1	2	3	4	5	6	7	8	9
10. Government Technical Training Centre, Gandhi Vidya Niketan, Naini Tal (1955).	..	..	20	20	(Closed in 1959)			
11. M. G. Polytechnic, Hathras (1955).	..	..	125	125	60	120	180	180
12. Allahabad Polytechnic, Allahabad (1955).	..	..	450	700	60	60	180	300
13. K. P. Engineering Institute, Allahabad (1956).	..	..	..	500	(Closed in 1959)		..	..
14. D. B. S. Engineering College, Kanpur (1956).	..	..	..	450	Ditto		..	..
15. Civil Engineering College, Meerut (1956).	..	..	..	250	Ditto		..	..
16. K. L. Polytechnic, Roorkee (1956).	..	..	..	230	60	60	180	240
17. Gandhi Polytechnic, Muzaffarnagar (1956).	..	..	..	130	60	60	120	120
18. D. J. Polytechnic, Baraut (Meerut) (1956).	..	..	..	150	60	60	120	120
19. D. N. Polytechnic, (Meerut) (1956),	..	..	..	110	60	60	150	180
20. Town Polytechnic, Ballia (1956).	..	..	..	280	60	60	60	60
21. M. P. Polytechnic, Gorakpur (1956).	..	..	..	220	60	60	120	120
22. Naini Tal Polytechnic, Naini Tal (1957).	..	..	..	..	60	60	180	180
23. Handia Polytechnic, Handia (Allahabad) (1957).	..	..	..	..	60	60	120	120

1	2	3	4	5	6	7	8	9
24. Chandauli Polytechnic, Chandauli (Varanasi) (1957).	..	..	..	..	60	60	120	120
25. Government Polytechnic, Jhansi (1957).	..	..	..	..	60	120	180	240
26. Government Polytechnic, Bareilly (1957).	..	..	..	..	60	120	180	240
27. Seth Ganga Sagar Jatia Polytechnic, Khurja (1960).	..	..	..	..	60	120	180	180
28. Government Polytechnic, Kanpur (1962).	..	..	..	..	..	..	240	300
29. Government Polytechnic, Faizabad (1963).	..	..	..	..	..	..	120	180
30. Government Polytechnic, Azamgarh (1963).	..	..	..	..	..	..	120	180
31. Government Polytechnic, Moradabad (1964).	..	..	..	..	..	..	180	240
32. Government Polytechnic, Mirzapur (1964).	..	..	..	..	..	..	120	180
33. Government Polytechnic, Gonda (1965).	..	..	..	..	..	..	60	120
34. Government Polytechnic, Basti (1965).	..	..	..	..	..	..	60†	120
Total ..	372	537	1,527	4,085	1,700	2,010	4,350	5,190
35. Government Polytechnic, Aryanagar Settlement, Lucknow (1965).	..	..	..	..	..	..	60	60
36. Diploma Polytechnic, Roorkee (1922).	80	80	140	140	240	240	Admissions closed from 1964	

† Actual admissions were 90.

1	2	3	4	5	6	7	8	9
37. Balwant Vidhyapeeth Institute of Rural Higher Education, Bichpuri, Agra (1956).	..	..	..	40	60	60	60	60
38. University Polytechnic, Aligarh Muslim University, Aligarh (1955).	74	90	90	90	240	240	240	240†
Total ..	526	707	1,757	4,355	2,240	2,550	4,710	5,550
39. Government College of Arts and Crafts, Lucknow (Architecture) (1911).	..	..	..	10	10	Nil	30††	30††
40. Government Central Textile Institute, Kanpur (1914).	32	30	32	32	30	30	30	30
41. Government Leather Institute, Kanpur (1916) (Leather Technology (Tanning).	..	..	..	..	10	10	10	10
42. Northern Regional Institute of Printing Technology, Allahabad (1967).	..	..	..	..	60	60	60	60
43. Government Leather Institute, Agra (1963) (Leather Technology (Tanning),	..	..	..	..	..	..	10	10
44. Government Girls' Polytechnic, Lucknow (1963).								
(i) Electronics	..	..	..	..	..	30	80	80
(ii) Architectural Assistantship.	..	..	..	..	..	20		
(iii) Stenography and Secretarial Practice,	..	..	..	..	..	30		

† Additional seats not known.
†† Admissions as restricted is 20 only.

1	2	3	4	5	6	7	8	9
45. School of Paper Technology, Saharanpur (1965) (Pulp and Paper Technology).	..	..	..	..	..	..	10	20
46. Indian Institute of Handloom Technology, Varanasi (1911).	20	20	20	20	20	20	20	25
Total ..	578	757	1,809	4,417	2,370	2,670	4,565	5,815
PART-TIME								
47. Hewett Polytechnic, Lucknow (C. E. M. Engineering).	..	..	..	..	..	..	100	100
48. Government Polytechnic, Kanpur (C. E. M.) Engineering')	..	..	..	..	..	..	100	100
49. Northern Regional Insitute of Printing Technology. Allahabad	..	..	..	..	..	30	60	60
POST-DIPLOMA								
50. Technical College, Dayalbagh, Agra (Automobile).	..	..	..	..	..	..	10	10
GRAND TOTAL ..	578	757	1,809	4,417	2,370	2,700	5,235	6,085

APPENDIX 2 1.1

(SHOWING POSITION OF WASTAGE IN CIVIL ENGINEERING COURSE AT THE ROORKEE UNIVERSITY, ROORKEE)

Serial no.	Batch admitted in First Year in the session	Sanctioned Intake	First Year					Second Year				Third Year				Final Year				Over-all Pass percentage $\frac{18\times100}{4}$	Over-all Wastage $\left(\frac{8-18}{8}\right)\times100$
			Number of students admitted	Number appeared in the examination	Number passed including Supplementary	Pass percentage $\left(\frac{6\times100}{5}\right)$	Wastage $\left(\frac{8-6}{8}\right)\times100$	Number of students appeared	Number passed including Supplementary	Pass percentage $\left(\frac{10\times100}{9}\right)$	Wastage $\left(\frac{9-10}{9}\right)\times100$	Number appeared	Number passed including Supplementary	Pass percentage $\left(\frac{14\times100}{13}\right)$	Wastage $\left(\frac{13-14}{13}\right)\times100$	Number appeared	Number passed including Supplementary	Pass percentage $\left(\frac{18\times100}{17}\right)$	Wastage $\left(\frac{17-18}{17}\right)\times100$		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1	1959-60	120	129	127	121	92	...	109	108	99	1	...	..	..	...	114	114	100	Nil	80	5
2	1960-61	120	112	113	107	95	11	123	111	90	10	111	103	93	7	102	102	100	Nil	91	15
3	1961-62	120	97	102	100	98	17	128	123	96	4	129	128	99	1	129	129	100	Nil	All	Nil

NOTES—(1) The information filled under First, Second, Third and Final year is for batches admitted in the academic session indicated in column 2.

(2) The reason for low figure of wastage for the batch admitted in 1959-60 is because of larger admission than the sanctioned intake.

(3) The information is compiled on the basis of letter no. Stat—141/Wastage dated 23th February, 1966 and letter no. Stat/402/Wastage, dated 3rd May, 1966.

(4) Up to 1959-60, it was a three-year degree course.

(5) Four-year degree course started in 1960-61.

(6) The average rate of wastage comes to 7 per cent. (col. 22)

APPENDIX—2.1.2

(SHOWING POSITION OF WASTAGE IN ELECTRICAL ENGINEERING COURSE AT THE ROORKEE UNIVERSITY, ROORKEE)

Serial no.	Batch admitted in First year in the session	Sanctioned Intake	First Year					Second Year					Third Year			Final Year					
			Number of students admitted	Number appeared in the examination	Number passed including Supplementary	Pass percentage $\left(\frac{6\times100}{5}\right)$	Wastage $\left(\frac{3-5}{3}\right)\times100$	Number of students appeared	Number passed including Supplementary	Pass percentage $\left(\frac{10\times100}{9}\right)$	Wastage $\left(\frac{9-10}{9}\right)\times100$	Number appeared	Number passed including Supplementary	Pass percentage $\left(\frac{14\times100}{13}\right)$	Wastage $\left(\frac{13-14}{13}\right)\times100$	Number appeared	Number passed including Supplementary	Pass percentage $\left(\frac{18\times100}{17}\right)$	Wastage $\left(\frac{17\times18}{17}\right)\times100$	Over-all pass percentage $\left(\frac{18\times100}{4}\right)$	Over-all wastage $\left(\frac{3-18}{3}\right)\times100$
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1	1959 60 ...	60	64	63	63	100	..	60	60	100	..	..	..	..	..	58	56	97	3	87	7
2	1960-61 ..	60	56	55	53	96	12	63	61	97	3	63	58	92	8	59	59	100	Nil	All	2
3	1961-62 ..	60	54	54	53	98	12	63	61	97	3	65	65	100	Nil	65	65	100	Nil	All	Nil

NOTES—(1) The information filled under First, Second, Third and Final year is for batches admitted in the academic session indicated in column 2.

(2) The information is compiled on the basis of letter no. Stat/141/Wastage, dated February 28, 1966 and letter no. Stat/402/Wastage, dated May 3, 1966.

(3) Up to 1959-60 it was a three-year degree course.

(4) Four year degree course was started in 1960-61.

(5) Average rate of wastage comes to 3 per cent (col. 22).

APPENDIX 2.1.3

(SHOWING POSITION OF WASTAGE IN MECHANICAL ENGINEERING COURSE AT THE ROORKEE UNIVERSITY, ROORKEE)

Serial number	Batch admitted in First year in the session	Sanctioned Intake	First Year					Second Year				Third Year				Final Year					
			Number of students admitted	Number appeared in the examination	Number passed including Supplementary	Pass percentage $\left(\frac{6\times100}{5}\right)$	Wastage $\left(\frac{3-5}{3}\right)\times100$	Number of students appeared	Number passed including Supplementary	Pass percentage $\left(\frac{10\times100}{9}\right)$	Wastage $\left(\frac{9-10}{9}\right)\times100$	Number appeared	Number passed including Supplementary	Pass percentage $\left(\frac{14\times100}{13}\right)$	Wastage $\left(\frac{13-14}{13}\right)\times100$	Number appeared	Number passed including Supplementary	Pass percentage $\left(\frac{18\times100}{17}\right)$	Wastage $\left(\frac{17-18}{17}\right)\times100$	Overall pass percentage $\left(\frac{18\times100}{4}\right)$	Overall wastage $\left(\frac{3-18}{3}\right)\times100$
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1	1959-60 ..	60	64	62	62	100	..	58	56	97	3	..	...	..	..	46	46	100	Nil	72	23
2	1960-61	60	52	52	49	94	18	64	64	100	Nil	64	62	97	3	62	62	100	Nil	A l	Nil
3	1961-62 ..	60	51	52	51	98	15	62	62	100	Nil	63	62	98	2	62	62	100	Nil	All	Nil

NOTE—(1) The information filled under First, Second, Third and Final year is for batches admitted in the academic session indicated in column 2.

(2) The information is compiled on the basis of letter no. Stat-142/Wastage, dated February 28, 1966 and letter no. Stat/402/Wastage dated May 3, 1966.

(3) Up to 1959-60 it was a three-year degree course.

(4) A four-year degree course was started in 1960-61.

(5) Average rate of wastage comes to 8 per cent. (Col. 22).

APPENDIX 2.1.4

(SHOWING POSITION OF WASTAGE IN TELE-COMMUNICATION ENGINEERING COURSE AT THE ROORKEE UNIVERSITY, ROORKEE)

Serial no.	Batch admitted in First Year in the session	Sanctioned Intake	First Year					Second Year				Third Year				Final Year				Overall pass percentage $\left(\frac{18\times100}{4}\right)$	Overall Wastage $\left(\frac{3-18}{3}\right)\times100$
			Number of students admitted	Number appeared in the examination	Number passed including Supplementary	Pass percentage $\left(\frac{6\times100}{5}\right)$	Wastage $\left(\frac{3-5}{3}\right)\times100$	Number of students appeared	Number passed including Supplementary	Pass percentage $\left(\frac{10\times100}{9}\right)$	Wastage $\left(\frac{9-10}{9}\right)\times100$	Number appeared	Number passed including Supplementary	Pass percentage $\left(\frac{14\times100}{13}\right)$	Wastage $\left(\frac{13-14}{13}\right)\times100$	Number appeared	Number passed including Supplementary	Pass percentage $\left(\frac{18\times100}{17}\right)$	Wastage $\left(\frac{17-18}{17}\right)\times100$		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1	1959-60 ..	30	29	28	28	97	6	31	29	94	6	..	..	..	..	27	26	96	4	90	13
2	1960-61 ..	30	23	23	23	100	23	16	12	75	25	10	10	100	Nil	10	10	100	Ni	43	66
3	1961-62 ...	30	36	20	16	80	47	26	22	85	15	22	22	100	Nil	22	22	100	Nil	61	27

NOTE—(1) The information filled under First, Second, Third and Final Year is for batches admitted in the academic session indicated in column 2.

(2) The reason for high wastage in the batch admitted in 1960-61 is because of the fact that full strength of students was not admitted.

(3) The information is compiled on the basis of letter no. Stat-141/Wastage, dated February 28, 1966 and letter no. Stat/402/Wastage of May 3, 1966.

(4) Average rate comes to 35 per cent. (Col. 22).

APPENDIX 2.1.5

(SHOWING POSITION OF WASTAGE IN ARCHITECTURE COURSE AT THE ROORKEE UNIVERSITY, ROORKEE)

Serial number	Batch admitted in the First Year in the session	Sanctioned Intake	First Year					Second Year				Third Year				Fourth Year				Final Year				Overall pass percentage $\left(\frac{22}{4}\times 100\right)$	Overall wastage $\left(\frac{3-22}{3}\times 100\right)$
			No. of students admitted	No. appeared in the examination	No. passed including Supplementary	Pass percentage $\left(\frac{6}{5}\times 100\right)$	Wastage $\left(\frac{3-5}{3}\right)\times 100$	No. of students appeared	No. passed including Supplementary	Pass percentage $\left(\frac{10}{9}\times 100\right)$	Wastage $\left(\frac{9-10}{9}\right)\times 100$	No. appeared	No. passed including Supplementary	Pass percentage $\left(\frac{14}{13}\times 100\right)$	Wastage $\left(\frac{13-14}{13}\right)\times 100$	No. appeared	No. passed including Supplementary	Pass percentage $\left(\frac{18}{17}\times 100\right)$	Wastage $\left(\frac{17-18}{17}\right)100$	No. appeared	No. passed including Supplementary	Pass percentage $\left(\frac{22}{21}\times 100\right)$	Wastage $\left(\frac{21-22}{22}\right)\times 100$		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
1	1959-60 ..	30	16	15	15	100	50	15	15	100	Nil	17	17	100	Nil	...	...	...	..	17	17	100	Nil	All	43
2	1960-61 ...	30	19	19	16	84	47	15	12	80	20	13	10	77	23	10	9	90	Nil	9	9	100	Nil	47	70

NOTE—(1) The information filled under First, Second, Third, Fourth and Final Year is for batches admitted in the academic session indicated in column 2.

(2) The duration of the course was raised to five years from the session 1960-61 .

(3) The information is compiled on the basis of letter no. Stat/141/Wastage, dated 28-2-66 and latter no. Stat/402/ Wastage of May 3, 1966.

(4) Average rate of wastage comes to 56 per cent col. 26. This is mainly because of full strength of students not being admitted in those years.

APPENDIX 2.2.1

(SHOWING POSITION OF WASTAGE IN CHEMICAL ENGINEERING COURSE AT THE H. B. TECHNOLOGICAL INSTITUTE, KANPUR).

Serial no.	Batch admitted in First Year in the session	Sanctioned Intake	First Year					Second Year				Third Year				Final Year					
			Number of students admitted	Number appeared in the examination	Number passed including Supplementary	Pass percentage $\left(\frac{6\times100}{5}\right)$	Wastage $\left(\frac{-6}{3}\right)\times100$	Number of students appeared	Number passed including Supplementary	Pass percentage $\left(\frac{10\times100}{9}\right)$	Wastage $\left(\frac{9-10}{9}\right)\times100$	Number appeared	Number passed including Supplementary	Pass percentage $\left(\frac{14\times100}{13}\right)$	Wastage $\left(\frac{13-14}{13}\right)\times1.0$	Number appeared	Number passed including Supplementary	Pass percentage $\left(\frac{18\times100}{17}\right)$	Wastage $\left(\frac{17-8}{17}\right)\times100$	Overall pass percentage $\left(\frac{18\times100}{4}\right)$	Overall wastage $\left(\frac{8-18}{8}\right)\times100$
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1	1960-61 ..	30	33	32	25	78	17	29	22	76	24	22	21	95	5	23	23	100	Nil	70	23
2	1961-62 ..	30	37	36	22	61	27	27	26	96	4	28	27	96	4	26	19	3	27	51	37
3	1962-63 ..	30	40	29	28	96	7	31	29	94	6	30	25	83	17	Information not available					

NOTES—(1) The information filled under First, Second, Third and Final Year is for batches admitted in the academic session indicated in column 2.

(2) Complete information was available in respect of two batches only.

(3) The information is compiled on the basis of letter no. 17 93/HBTI/Stn/Sta, dated March 11, 1966.

(4) Average rate of wastage of two years comes to 30 per cent (col. 22)

APPENDIX 2.2.2

(SHOWING POSITION OF WASTAGE IN CHEMICAL TECHNOLOGY COURSE AT THE H. B. TECHNOLOGICAL INSTITUTE, KANPUR)

Serial number	Batch admitted in first year in the session	Sanctioned Intake	First year					Final year				Overall pass percentage $\left(\frac{10}{4}\times 100\right)$	Overall wastage $\left(\frac{3-10}{3}\right)\times 100$
			Number of students admitted	Number appeared in the examination	Number passed including Supplementary	Passed percentage $\frac{6\times 100}{5}$	Wastage $\left(\frac{3-6}{3}\right)\times 100$	Number appeared	Number passed including Supplementary	Pass percentage $\left(\frac{10}{9}\times 100\right)$	Wastage $\left(\frac{9-10}{9}\right)\times 100$		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	1960-61 ..	8	9	8	8	100	..	8	8	100	Nil	90	Nil
2	1961-62 ..	8	10	10	8	80	...	8	6	75	25	60	25
3	1962-63 ..	8	10	10	8	80	..	10	7	70	30	70	12
4	1963-64 ..	8	23	14	14	100	..	17	17	100	Nil	74	Nil

NOTES—(1) The information filled under First and Final year is for batches admitted in the academic session indicated in column 2.

(2) The duration of the course was two years.

(3) The information is compiled on the basis of letter no. 17093/HBTI/STU/Sta, dated March 11, 1966.

(4) There is no wastage shown in column 14 for batch admitted in 1960-61 and 1963-64 because of no wastage is indicated for the admissions being larger than the sanctioned intake. Average rate of wastage of 1961-62 and 1962-63 batch comes to 14 per cent (Col. 14).

APPENDIX 2.3.1

(SHOWING POSITION OF WASTAGE IN MINING COURSE AT THE COLLEGE OF MINING AND METALLURGY, BANARAS HINDU UNIVERSITY, VARANASI.)

Serial number	Batch admitted in First Year in the session	Sanctioned Intake	First Year					Second Year				Third Year				Fourth Year				Final Year					
			Number of students admitted	Number appeared in the examination	Number passed including Supplementary	Pass percentage $\left(\frac{6}{5}\times 100\right)$	Wastage $\left(\frac{3-6}{3}\right)\times 100$	Number of students appeared	Number passed including Supplementary	Pass percentage $\left(\frac{10}{9}\times 100\right)$	Wastage $\left(\frac{9-10}{9}\times 100\right)$	Number appeared	Number passed including Supplementary	Pass percentage $\left(\frac{14}{13}\times 100\right)$	Wastage $\left(\frac{13-14}{13}\times 100\right)$	Number appeared	Number passed including Supplementary	Pass percentage $\left(\frac{18}{17}\times 100\right)$	Wastage $\left(\frac{17-18}{17}\right)\times 100$	Number appeared	Number passed including Supplementary	Pass percentage $\left(\frac{22}{21}\times 100\right)$	Wastage $\left(\frac{21-22}{22}\right)\times 100$	Over-all pass percentage $\left(\frac{22}{4}\times 100\right)$	Overall wastage $\left(\frac{3-22}{3}\times 100\right)$
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
1	1958-59 ..	40	40	29	28	96	27	30	24	80	20	24	24	100	Nil	..	..	..	..	24	23	96	4	58	42
2	1959-60 ..	40	44	40	38	95	Nil	46	33	72	28	33	31	94	6	..	..	..	..	32	32	100	Nil	73	20
3	1960-61 ..	40	41	Information not available				41	30	74	26	32	28	88	12	31	29	94	6	29	29	100	Nil	71	28

NOTES—(1) The information filled under First, Second, Third, Fourth and Final year is for batches admitted in the academic session about indicated in column 2.

(2) In 1960-61 admission in First Year was made at Central Hindu College, Kamachcha and direct admission was made in the College of Mining and Metallurgy in Second year and the total duration of the course was raised to five years.

(3) Till 1959-60, the duration of the course was four years.

(4) The information is compiled on the basis of letters no. Misc./44/7224, dated March 31, 1966 and no. Misc./44/893, dated June 4, 1966 from the Deputy Registrar (Academic) of the University.

(5) Average overall wastage comes to 30 per cent (Col. 26).

APPENDIX 2.3.2

(SHOWING POSITION OF WASTAGE IN METALLURGICAL ENGINEERING COURSE AT THE COLLEGE OF MINING AND METALLURGY, BANARAS HINDU UNIVERSITY, VARANASI)

Serial no.	Batch admitted in First Year in the session	Sanctioned Intake	First Year					Second Year				Third Year				Fourth Year				Final Year				Overall pass percentage $\left(\frac{22}{4}\times 100\right)$	Overall wastage $\left(\frac{8-22}{3}\times 100\right)$
			Number of students admitted	Number appeared in the examination	Number passed including Supplementary	Pass percentage $\left(\frac{6}{5}\times 100\right)$	Wastage $\left(\frac{8-6}{8}\times 100\right)$	Number of students appeared	Number passed including Supplementary	Pass percentage $\left(\frac{10}{9}\times 100\right)$	Wastage $\left(\frac{9-10}{9}\times 100\right)$	Number appeared	Number passed including Supplementary	Pass percentage $\left(\frac{14}{13}\times 100\right)$	Wastage $\left(\frac{13-14}{13}\times 100\right)$	Number appeared	Number passed including Supplementary	Pass percentage $\left(\frac{18}{17}\times 100\right)$	Wastage $\left(\frac{17-18}{17}\times 100\right)$	Number appeared	Number passed including Supplementary	Pass percentage $\left(\frac{22}{21}\times 100\right)$	Wastage $\left(\frac{21-22}{22}\times 100\right)$		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
1	1958-59 ..	60	60	55	40	73	8	48	40	83	17	43	37	86	14	..	..	..	..	37	36	97	3	60	40
2	1959-60 ...	60	60	56	51	91	7	58	52	89	11	55	53	96	4	...	...	..	..	54	54	100	Nil	90	10
3	1960-61 ..	60	62	Information not available				62	51	82	18	60	56	93	7	57	6	98	2	56	52	93	7	84	18

NOTES—(1) The information filled under First, Second, Third, Fourth and Final Year is for batches admitted in the academic session indicated in column 2.

(2) In 1960-61 admission was made in First Year at Central Hindu College, Kamachcha and direct admission was made in the College in Second Year and the total duration of the course was raised to five years.

(3) Till 1959-60, the duration of the course was four years.

(4) The information is compiled on the basis of letter no. Misc./44/7224, dated 31st March, 1966 and no. Misc./44/893, dated 8th June, 1966 from the Deputy Registrar (Academic) of the University.

(5) Average over all wastage comes to 21 per cent (Col. 26).

APPENDIX 2.3.3

(SHOWING POSITION OF WASTAGE IN CHEMICAL ENGINEERING COURSE AT THE COLLEGE OF CHEMICAL ENGINEERING AND TECHNOLOGY, BANARAS HINDU UNIVERSITY, VARANASI)

Serial number	Batch admitted in First Year in the session	Sanctioned intake	First Year					Second Year				Third Year				Fourth Year				Final Year				Overall pass percentage $\left(\frac{22}{4}\times 100\right)$	Overall wastage $\left(\frac{3-22}{8}\times 100\right)$
			Number of students admitted	Number appeared in the examination	Number passed including Supplementary	Pass percentage $\left(\frac{6}{6}\times 100\right)$	Wastage $\left(\frac{3-6}{3}\right)\times 100$	Number of students appeared	Number passed including Supplementary	Pass percentage $\left(\frac{10}{9}\times 100\right)$	Wastage $\left(\frac{9-10}{9}\right)\times 100$	Number appeared	Number passed including Supplementary	Pass percentage $\left(\frac{14}{13}\times 100\right)$	Wastage $\left(\frac{18-14}{13}\right)\times 100$	Number appeared	Number passed including Supplementary	Pass percentage $\left(\frac{18}{17}\times 100\right)$	Wastage $\left(\frac{17-18}{17}\right)\times 100$	Number appeared	Number passed including Supplementary	Pass percentage $\left(\frac{22}{21}\times 100\right)$	Wastage $\left(\frac{21-22}{22}\right)\times 100$		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
1	1960-61	60	60	..	..	..	..	57	35	62	38	44	36	82	18	45	38	84	16	44	44	100	Nil	73	27
2	1961-62	30	32	..	...	..	..	42	31	74	26	40	36	81	19	37	37	100	Nil	35	35	100	Ni	All passed	Nil

NOTETS—(1) The information filled under First, Second, Third, Fourth and Final Year is for batches admitted in the academic session indicated in column 2.

(2) In the session 1960-61, admission to First Year of the Five Year integrated course was made at Central Hindu College, Kamachcha and direct admission to Second Year were made in this college.

(3) The information is compiled on the basis of letter no. 304/CT, dated April 30, 1966, from the Principal of the College to the Deputy Registrar (Academic) of the University.

(4) Average rate of wastage comes to 13 per cent (Col. 26).

APPENDIX-2.3.4

(SHOWING POSITION OF WASTAGE IN CIVIL, ELECTRICAL AND MECHANICAL ENGINEERING COURSES TAKEN TOGETHER AT THE ENGINEERING COLLEGE, BANARAS HINDU UNIVERSITY, VARANASI)

Serial Number	Batch admitted in First Year in the session	Sanctioned Intake	First Year					Second Year				Third Year				Fourth Year				Final Year				Overall pass percentage $\left(\frac{22}{4}\times 100\right)$	Overall wastage $\left(\frac{3-22}{3}\times 100\right)$
			No. of students admitted	Number appeared in the examination	Number passed including supplementary	Pass percentage $\left(\frac{6}{5}\times 100\right)$	Wastage $\left(\frac{3-6}{3}\right)\times 100$	Number of students appeared	Number passed including supplementary	Pass percentage $\left(\frac{10}{9}\times 100\right)$	Wastage $\frac{10}{9}\times 100$	Number appeared	Number passed including supplementary	Pass percentage $\left(\frac{14}{13}\times 100\right)$	Wastage $\left(\frac{13-14}{13}\right)\times 100$	Number appeared	Number passed including supplementary	Pass percentage $\left(\frac{18}{17}\times 100\right)$	Wastage $\left(\frac{17-18}{17}\right)\times 100$	Number appeared	Number passed including supplementary	Pass percentage $\left(\frac{22}{21}\times 100\right)$	Wastage $\left(\frac{21-22}{22}\right)\times 100$		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
1	1958-59	270	312	251	192	77	7	213	171		20	188	151	80	20	..	...	...	..	169	168	96	4	52	40
2	1959-60	270	327	239	231	86	Nil	269	186	69	31	201	201	94	6	..	..	..	..	208	205	99	1	63	24
3	1960-61	270	270	Information not available				269	232	86	14	273	261	95	5	262	247	94	6	249	245	99	1	91	9

NOTE—(1) The information filled under First, Second, Third, Fourth and Final year is for batches admitted in the academic session indicated in column 2.

(2) In the session 1960-61, admission to first year was made at Central Hindu College, Kamachcha and direct admission were made in the Engineering College in Second year and the duration of the course raised to five years.

(3) Till 1959-60, the duration of the course was four years.

(4) The information is compiled on the basis of information in letter no.126/IV/6838, dated 9th March, 1966 and Misc./44/893, dated 4th June, 1966 from Deputy Registrar (Academic) of the University.

(5) Average rate of overall wastage comes to 24 per cent (col. 26).

APPENDIX 2.4

(SHOWING POSITION OF WASTAGE IN CIVIL, ELECTRICAL AND MECHANICAL ENGINEERING COURSES TAKEN TOGETHER AT THE COLLEGE OF ENGINEERING AND TECHNOLOGY MUSLIM UNIVERSITY, ALIGARH)

Serial Number	Batch admitted in First year in the session	Sanctioned Intake	First Year					Second Year					Third Year			Final Year					
			Number of students admitted	Number appeared in the examination	Number passed including Supplementary	Pass percentage $\left(\frac{6\times100}{5}\right)$	Wastage $\left(\frac{3-5}{3}\right)\times100$	Number of student appeared	Number passed including Supplementary	Pass percentage $\left(\frac{10\times100}{9}\right)$	Wastage $\left(\frac{9-10}{9}\right)\times100$	Number appeared	Number passed including Supplementary	Pass percentage $\left(\frac{14\times100}{13}\right)$	Wastage $\left(\frac{13-14}{13}\right)\times100$	Number appeared	Number passed including Supplementary	Pass percentage $\left(\frac{18\times100}{17}\right)$	Wastage $\left(\frac{17-18}{17}\right)\times100$	Over-all pass percentage $\left(\frac{18\times100}{4}\right)$	Over-all wastage $\left(\frac{3-18}{3}\right)\times100$
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1	1958-59 ..	120	120	120	98	82	18	97	90	93	7	87	33	95	5	88	88	100	Nil	69	31
2	1959-60 ..	132	132	130	112	86	14	112	97	87	13	97	92	95	5	92	87	95	5	66	34
3	1960-61 ..	120	120	120	109	91	9	103	96	91	9	96	96	100	Nil	96	91	95	5	76	24

NOTE—(1) The information filled under First, Second, Third and Final Year is for batches admitted in the academic session indicated in column 2.

(2) The information is compiled on the basis of letter no. 8352 of 14-5-'66.

(3) Average rate of wastage comes to 30 per cent (col. 22).

APPENDIX 2·5

(SHOWING POSITION OF WASTAGE IN ELECTRICAL AND MECHANICAL ENGINEERING COURSES TAKEN TOGETHER AT THE ENGINEERING COLLEGE, DAYALBAGH, AGRA)

Serial Number	Batch admitted in First Year in the session	Sanctioned Intake	First Year					Second Year					Third Year			Final Year				Over all Pass percentage $\frac{18 \times 100}{4}$	Over all Wastage $\left(\frac{3-18}{3}\right) \times 100$
			Number of students admitted	Number appeared in the examination	Number passed including Supplementary	Pass percentage $\left(\frac{6 \times 100}{5}\right)$	Wastage $\left(\frac{3-6}{3}\right) \times 100$	Number of students appeared	Number passed including Supplementary	Pass percentage $\left(\frac{10 \times 100}{9}\right)$	Wastage $\left(\frac{9-10}{9}\right) \times 100$	Number appeared	Number passed including Supplementary	Pass percentage $\left(\frac{14 \times 100}{13}\right)$	Wastage $\left(\frac{13-14}{13}\right) \times 100$	Number appeared	Number passed including Supplementary	Pass percentage $\left(\frac{18 \times 100}{17}\right)$	Wastage $\left(\frac{17-18}{17}\right) \times 100$		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1	1958-59 ..	60	60	64	40	63	33	46	41	89	11	45	41	91	9	41	41	100	Nil	68	32
2	1959-60 ..	60	60	66	40	67	33	47	43	92	8	47	45	96	4	46	45	98	2	75	25
3	1960-61 ..	60	65	65	54	83	10	58	56	97	3	57	54	95	5	56	56	100	Nil	86	7
4	1961-62 ..	60	65	63	63	100	Nil	57	54	95	5	64	58	91	9	58	57	98	2	88	5

NOTE—(1) The information filled under First, Second, Third and Final year is for batches admitted in the academic session indicated in column 2.

(2) Information has been compiled for Electrical and Mechanical Engineering courses taken together as the course is common up to second year.

(3) The information is compiled on the basis of letter no. 2325/E.C. of 21-2-1966 and letter no. nil, dated 29-4-1966.

(4) Average rate of wastage comes to 17 per cent, (col. 22).

(5) The figures in col. 22 are lower for the batches admitted in 1960-61 and 1961-62.

APPENDIX 2.6

(SHOWING POSITION OF WASTAGE IN TEXTILE TECHNOLOGY AND TEXTILE CHEMISTRY COURSES TAKEN TOGETHER AT THE GOVERNMENT CENTRAL TEXTILE INSTITUTE, KANPUR)

Serial Number	Batch admitted in First year in the session	Sanctioned Intake	First Year					Second Year				Third year				Final Year					
			Number of students admitted	Number appeared in the examination	Number passed including Supplementary	Pass percentage $\left(\frac{6\times100}{5}\right)$	Wastage $\left(\frac{3-6}{3}\right)\times100$	Number of students appeared	Number passed including Supplementary	Pass Percentage $\left(\frac{10\times100}{9}\right)$	Wastage $\left(\frac{9-10}{9}\right)\times100$	Number appeared	Number passed including Supplementary	Pass Percentage $\left(\frac{14\times100}{13}\right)$	Wastage $\left(\frac{13-14}{13}\right)\times100$	Number appeared	Number of passed including Supplementary	Pass percentage $\left(\frac{18\times100}{17}\right)$	Wastage $\left(\frac{17-18}{17}\right)\times100$	Over all pass percentage $\frac{18\times100}{4}$	Over all Wastage $\left(\frac{3-18}{3}\right)\times100$
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1	1958-59 ..	60	60	48	42	86	30	42	42	100	Nil	21	21	100	Nil	21	20	95	5	33	66
2	1959-60 ..	60	60	50	44	88	26	44	42	94	6	21	19	90	10	Information not available					
3	1960-61 ..	60	60	50	46	92	23	46	36	78	22	Information not available									

NOTE—(1) The information filled under First, Second, Third and Final Year is for batches admitted in the academic session indicated in column 2.

(2) The information is for Textile Technology and Textile Chemistry courses taken together.
(3) Complete information was available in respect of one batch only.
(4) The information is compiled on the basis of D. O. Letter no. 921/EX—IX—DC—5, dated 20th June, 1966.

(5) In First year the students leave after securing admission and join Engineering Colleges where they get admission lateron.
(6) Information in cols. 4 and 5 show that about 17 per cent wastage was only on this account.

APPENDIX 2.7

(SHOWING POSITION OF WASTAGE IN AGRICULTURAL ENGINEERING COURSE AT THE ALLAHABAD AGRICULTURE INSTITUTE, ALLAHABAD)

Serial Number	Batch admitted in First Year in the session	Sanctioned Intake	First Year			Second Year						Final Year					
			Number of students admitted	Number appeared in the examination	Number passed including Supplementary	Pass Percentage $\frac{6}{5}\times 100$	Wastage $\left(\frac{3-6}{3}\right)\times 100$	Number of students appeared	Number passed including Supplementary	Pass percentage $\left(\frac{10}{9}\times 100\right)$	Wastage $\left(\frac{9-10}{9}\right)\times 100$	Number appeared	Number passed including Supplementary	Pass percentage $\left(\frac{14}{18}\times 100\right)$	Wastage $\left(\frac{13-14}{18}\right)\times 100$	Over all Pass percentage $\left(\frac{14}{4}\times 100\right)$	Over all Wastage $\left(\frac{8-14}{8}\right)\times 100$
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	1960-61 ...	30	30	28	21	75	30	21	21	100	11	21	21	100	8	70	30
2	1961-62 ..	40	40	40	30	75	25	30	30	100	11	30	28	93	15	70	30
3	1962-63 ...	40	40	40	19	48	52	19	19	100	11	24	24	100	8	60	40

NOTE—(1) The information filled under First, Second, and Final year is for batches admitted in the academic session indicated in column 2.

(2) The four year course in B. Sc. Ag. Engineering was started from the academic session 1964-65.

(3) The information is compiled on the basis of letter no. R/134/65-66, dated 15th April, 1966.

(4) The average rate of wastage comes to 33 per cent. (col. 18).

APPENDIX 2.8

(SHOWING POSITION OF WASTAGE IN CIVIL, ELECTRICAL, MECHANICAL, CHEMICAL, METALLURGICAL AND AERONAUTICAL ENGINEERING COURSES, TAKEN TOGETHER AT THE INDIAN INSTITUTE OF TECHNOLOGY, KANPUR)

Serial Number	Batch admitted in First Year in the session	Sanctioned Intake	First Year					Second Year				Third Year				Fourth Year				Final Year					
			No. of students admitted	No. appeared in the examination	No. passed including Supplementary.	Pass Percentage $\left(\frac{6}{5}\times 100\right)$	Wastage $\left(\frac{3-6}{8}\right)\times 100$	No. of students appeared	No. passed including Supplementary	Pass Percentage $\left(\frac{10}{9}\times 100\right)$	Wastage $\left(\frac{9-10}{9}\right)\times 100$	No. appeared	No. passed including Supplementary	Pass Percentage $\left(\frac{14}{13}\times 100\right)$	Wastage $\left(\frac{18-14}{13}\right)\times 100$	No. appeared	No. passed including Supplementary	Passed Percentage $\left(\frac{18}{17}\times 100\right)$	Wastage $\left(\frac{17-18}{17}\right)\times 100$	No. appeared	No. passed including Supplementary	Pass Percentage $\left(\frac{22}{21}\times 100\right)$	Wastage $\left(\frac{21-22}{22}\right)\times 100$	Over all pass percentage $\left(\frac{22}{4}\times 100\right)$	Over all wastage $\left(\frac{23}{3}\times 100\right)$
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
1	1960-61	100	100	95	87	91	13	85	78	92	8	74	73	99	1	75	68	91	9	68	66	97	2	66	34
2	1961-62	100	105	102	98	96	2	103	93	90	10	95	61	64	36	67	67	100	Nil	Information not available					

NOTE—(1) The information filled under First, Second, Third, Fourth and Final Year is for batches admitted in the academic session indicated in column 2.

(2) In 1961-62, Aeronautical Engineering was also added.

(3) The institute was started in 1960-61 and in this first batch 11 students dropped out during the course of five years.

(4) The information is compiled on the basis of letter No. A/E/Stat/66/283—31128, dated 28th February, 1966.

(5) High rate of wastage is also partly because of its being the first batch with no previous year's failures to neutralise the effect partially.

APPENDIX 2.9

(SHOWING POSITION OF WASATGE IN CIVIL, ELECTRICAL AND MECHANICAL ENGINEERING COURSES TAKEN TOGETHER AT THE MOTILAL NEHRU ENGINEERING COLLEGE ALLAHABAD)

Serial number	Batch admitted in First Year in the session	Sanctioned Intake	First Year					Second Year				Third Year				Final Year				Over all pass percentage $\left(\frac{18 \times 100}{4}\right)$	Overall wastage $\left(\frac{8-18}{3}\right) \times 100$
			Number of students admitted	Number appeared in the examination	Number passed including Supplementary	Pass percentage $\left(\frac{6 \times 100}{5}\right)$	Wastage $\left(\frac{3-6}{3}\right) \times 100$	Number of students appeared	Number passed including Supplementary	Pass percentage $\left(\frac{10 \times 100}{9}\right)$	Wastage $\left(\frac{9-10}{9}\right) \times 100$	Number appeared	Number passed including Supplementary	Pass percentage $\left(\frac{14 \times 100}{13}\right)$	Wastage $\left(\frac{13-14}{13}\right) \times 100$	Number appeared	Number passed including Supplementary	Pass percentage $\left(\frac{18 \times 100}{17}\right)$	Wastage $\left(\frac{17-18}{17}\right) \times 100$		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1	1961-62 ..	100	99	98	85	87	14	84	82	98	2	81	76	94	6	76	76	100	Nil	76	24
2	1262-63 ..	100	104	104	90	88	10	91	89	98	2	93	88	93	7	Information not available				..	..

NOTE—(1) The information filled under First, Second, Third and Final year is for batches admitted in the academic session indicated in column 2.

(2) The information is compiled on the basis of letter no. 759 of 11th June, 1966.

(3) High rate of wastage is because of its being the first batch with no previous year's failures to neutralise the effect partially.

APPENDIX 2.10

(SHOWING OVERALL POSITION OF THE WASTAGE IN DEGREE COURSES)

Serial No.	Name of Institution	Name of course	Percentage of wastage (Average)	Reference to Appendix no.
1	Roorkee University, Roorkee ..	Civil, Elect and Mech. Engg. ..	6	2.1.1, 2.1.2 and 2.1.3.
2	College of Engineering B. H. U., Varanasi.	Ditto	24	2.3.4
3	College of Engineering and Technology, Aligarh Muslim University, Aligarh.	Ditto	30	2.4
4	Engineering College, Dayalbagh, Agra.	Elect. and Mech. Engg. ..	17	2.5
5	Indian Institution of Technology, Kanpur.†	Civil, Elect and Mech., Chemical Engg. and Metallurgical Engg.	34	2.8
6	Moti Lal Nehru Regional Engineering College, Allahabad.††	Civil, Elect. and Mech. Engg. ...	24	2.9
	Average	..	20	..
		B - OTHER COURSES		
7	Roorkee University, Roorkee ..	Tele-Communication Engg. ..	35	2.1.4
		Architecture†††	56	2.1.5
8	College of Mining and Metallurgy, B. H. U., Varanasi.	Mining and Metallurgy ..	25	2.3.1 and 2.3.2
9	College of Chemical Engineering and Technology, B H. U., Varanasi.	Chemical Engg.	27	2.3.3
10	H. B. Technological Institute, Kanpur.	Chemical Engg.	30	2.2.1
		Chemical Technology ...	14	2.2.2
11	Government Central Textile Institute, Kanpur.††††	Textile Technology and Textile Chemistry.	65	2.6
12	Allahabad Agriculture Institute, Allahabad.	Agriculture Engg.	33	2.7
	Average	..	27	..

† Separate figures for Civil, Elect. and Mech. Engg. were not available. Not considered for average because of the unusually high rate of drop outs.

†† The figures were available for one batch only.

††† The high rate of wastage is because full strength of admissions was not made and hence not included in working out the average.

†††† Because of unusually high rate of wastage and that too available for one year only, not considered for average.

APPENDIX 3.1.1

(SHOWING POSITION OF PASS PERCENTAGE AND WASTAGE IN CIVIL ENGINEERING COURSE IN DIPLOMA INSTITUTIONS AFFILIATED TO THE BOARD)

Serial Number	Batch admitted in First Year in the session.	Sanctioned Intake	First Year					Second Year				Final Year					
			Number of students admitted	Number appeared in the Examination	Number passed including Supplementary	Pass Percentage $\left(\frac{6\times100}{5}\right)$	Wastage $\left(\frac{3-6}{3}\times100\right)$	Number of students appeared	Number passed including Supplementary	Pass Percentage $\left(\frac{10}{9}\times100\right)$	Wastage $\left(\frac{9-10}{9}\times100\right)$	Number appeared	Number passed including Supplementary	Pass Percentage $\left(\frac{14\times100}{13}\right)$	Wastage $\left(\frac{13-14}{13}\right)\times100$	Overall Pass Percentage $\left(\frac{14\times100}{4}\right)$	Overall Wastage $\left(\frac{3-14}{3}\right)\times100$
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	1960-61 ..	1,280	1,242	984	616	63	52	679	535	79	21	611	498	82	18	51	62
2	1961-62 ..	1,170	1,181	1,080	620	57	47	675	507	75	25	611	506	83	19	47	57
3	1962-63 ..	1,095	1,15	1,067	621	58	43	629	463	74	26	570	503	88	12	47	54
4	1963-64 ..	1,040	1,107	996	687	69	34	754	607	81	19	Information not available					

NOTES—(1) The information filled under First, Second and Final Year is for batches admitted in the academic session indicated in column 2.

(2) Except for information in column 4, rest of figures are based on the information available in the office of the Board of Technical Education.

(3) Information in column 4 is based on data collected from the institutions.

(4) The average overall wastage comes to 58% (col. 18).

APPENDIX 3.1.2

(SHOWING POSITION OF PASS PERCENTAGE AND WASTAGE IN ELECTRICAL ENGINEERING COURSE IN DIPLOMA INSTITUTIONS AFFILIATED TO THE BOARD)

Serial Number	Batch admitted in First Year in the session	Sanctioned Intake	First Year					Second Year				Final Year				Overall pass percentage $\left(\frac{14}{4}\times100\right)$	Overall wastage $\left(\frac{3-14}{3}\right)\times100$
			Number of students admitted	Number appeared in the Examination	Number passed including Supplementary	Pass Percentage $\left(\frac{6\times100}{5}\right)$	Wastage $\left(\frac{3-6}{3}\right)\times100$	Number of students appeared	Number passed including Supplementary	Pass percentage $\left(\frac{10}{9}\times100\right)$	Wastage $\left(\frac{9-10}{9}\right)\times100$	Number appeared	Number passed including Supplementary	Pass percentage $\left(\frac{14\times100}{13}\right)$	Wastage $\left(\frac{13-14}{13}\right)\times100$		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	1960-61 ..	330	302	269	190	71	42	212	157	74	26	179	167	93	7	62	49
2	1961-62 ...	420	406	378	272	72	35	349	291	83	17	298	275	92	8	73	35
3	1962-63 ..	665	686	633	439	69	34	476	400	84	16	413	358	86	14	56	46
4	1963-64 ...	1,295	1,260	1,178	916	78	30	987	816	83	17	Information not available					

NOTES (1)—The information filled under First, Second and Final Year is for batches admitted in the academic session indicated in column 2.

(2) Except for information in column 4, rest of the figures are based on the information available in the office of the Board of Technical Education.

(3) Information in column 4 is based on data collected from the institutions.

(4) Average overall wastage comes to 42 per cent (Col. 18).

APPENDIX 3.1.3

(SHOWING POSITION OF PASS PERCENTAGE AND WASTAGE IN MECHANICAL ENGINEERING COURSE IN DIPLOMA INSTITUTIONS AFFILIATED TO THE BOARD)

Serial Number	Batch admitted in First year in the session	Sanctioned Intake	First Year					Second Year				Final Year					
			Number of students admitted	Number appeared in the Examination	Number passed including Supplementary	Pass Percentage $\left(\frac{6\times100}{5}\right)$	Wastage $\left(\frac{3-6}{3}\right)\times100$	Number of students appeared	Number passed including Supplementary	Pass percentage $\left(\frac{10}{9}\times100\right)$	Wastage $\frac{(9-10)}{9}\times100$	Number appeared	Number passed including Supplementary	Pass Percentage $\left(\frac{14\times100}{18}\right)$	Wastage $\left(\frac{18-14}{18}\right)\times100$	Overall pass percentage $\left(\frac{14\times100}{4}\right)$	Overall Wastage $\left(\frac{8-14}{8}\right)\times100$
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	1960-61 ..	330	305	277	227	82	31	256	189	74	26	205	196	96	4	71	41
2	1961-62 ...	420	406	386	328	85	22	406	351	86	14	360	328	91	9	85	22
3	1962-63 ..	668	680	625	495	79	26	596	505	85	15	532	493	93	7	79	26
4	1963-64 ..	1295	1226	1179	980	83	24	1123	959	86	14	Information no available					

Norms—(1) The information to be filled under First, Second and Final Year is for batches admitted in the academic session indicated in column 2.

(2) Except for information in column 4 rest of figures are based on the information available in the office of the Board of Technical Education.

(3) Information in column 4 is based on data collected from the institutions.

(4) Average overall wastage comes to 30 per-cent (col. 18)

APPENDIX 3.2

(SHOWING POSITION OF WASTAGE IN LEATHER TECHNOLOGY (TANNING) COURSE AT THE GOVERNMENT LEATHER INSTITUTE, KANPUR)

Serial Number	Batch admitted in First year in the session	Sanctioned Intake	First year					Final year				Overall Pass Percentage $\left(\frac{10}{4}\times 100\right)$	Overall Wastage $\left(\frac{3-10}{3}\right)\times 100$
			Number of students admitted	Number appeared in the Examination	Number passed including Supplementary	Pass percentage $\left(\frac{6\times 100}{5}\right)$	Wastage $\left(\frac{3-6}{3}\right)\times 100$	Number appeared	Number passed including Supplementary	Pass Percentage $\left(\frac{10}{9}\times 100\right)$	Wastage $\left(\frac{9-10}{9}\right)\times 100$		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	1960-61	10	10	9	7	78	22	8	8	100	..	80	20
2	1961-62	10	10	8	8	100	..	8	8	100	...	80	20
3	1962-63	10	6	4	4	100	..	4	4	100	..	40	60
4	1963-64	10	10	10	8	80	20	8	6	75	25	60	40

NOTE—(1) The information filled under First, and Final year is for batches admitted in the academic session indicated in column 2.

(2) Except for information in column 4 rest of the figures are based on the information available in the office of the Board of Technical Education.

(3) Information in column 4 is based on data collected from the institutions.

(4) Average rate of wastage comes to 35 per cent. (col. 14).

APPENDIX 3.3

(SHOWING POSITION OF WASTAGE IN TEXTILE TECHNOLOGY AND TEXTILE CHEMISTRY COURSES TAKEN TOGETHER AT THE GOVERNMENT CENTRAL TEXTILE INSTITUTE, KANPUR)

Serial Number	Batch admitted in First year in the session	Sanctioned Intake	First year					Second year				Final year					
			Number of students admitted	Number appeared in the Examination	Number passed including Supplementary	Pass Percentage $\left(\frac{6\times100}{5}\right)$	Wastage $\left(\frac{8-6}{8}\right)\times100$	Number of students appeared	Number passed including Supplementary	Pass Percentage $\left(\frac{10}{9}\times100\right)$	Wastage $\left(\frac{9-10}{9}\right)\times100$	Number appeared	Number passed including Supplementary	Pass Percentage $\left(\frac{14\times100}{13}\right)$	Wastage $\left(\frac{13-14}{13}\right)\times100$	Overall Pass Percentage $\left(\frac{14}{4}\times100\right)$	Overall Wastage $\left(\frac{3-14}{3}\right)\times100$
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	1960-61 ..	30	...	21	16	76	47	17	17	100	..	17	17	100	..	81	43
2	1961-62 ...	30	24	22	14	64	53	13	13	100	..	13	13	100	..	59	57
3	1962-63 ..	30	28	26	18	69	40	17	16	94	6	16	16	100	..	62	47

NOTE—(1) The information filled under First, Second, and Final year is for batches admitted in the academic session indicated in column 2.

(2) Except for information in column 4, rest of the figures are based on information available in the office of the Board of Technical Education.

(3) Information in column 4 is based on data collected from the institutions.

(4) Average rate of wastage comes to 49 per cent. (col. 18).

APPENDIX 3.4

(SHOWING POSITION OF WASTAGE IN PRINTING TECHNOLOGY (LETTER PRESS PRINTING AND LITHOGRAPHY) TAKEN TOGETHER AT THE NORTHERN REGIONAL INSTITUTE OF PRINTING TECHNOLOGY, ALLAHABAD)

Serial Number	Batch admitted in First year in the session	Sanctioned Intake	First year					Second year				Final year					
			Number of students admitted	Number appeared in the Examination	Number passed including Supplementary,	Pass Percentage $\left(\frac{6\times100}{5}\right)$	Wastage $\left(\frac{3-6}{3}\right)\times100$	Number of students appeared	Number passed including Supplementary	Pass Percentage $\left(\frac{10}{9}\times100\right)$	Wastage $\left(\frac{9-10}{9}\right)\times100$	Number appeared	Number passed including Supplementary	Pass Percentage $\left(\frac{14\times100}{13}\right)$	Wastage $\left(\frac{13-14}{13}\right)\times100$	Overall Pass Percentage $\left(\frac{14}{4}\times100\right)$	Overall Wastage $\left(\frac{14}{3}\times100\right)$
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	1960-61 ..	60	49	48	35	73	42	35	28	80	20	28	27	96	4	56	55
2	1961-62 ..	60	60	37	27	73	55	34	33	97	3	34	31	91		84	48
3	1962-63 ...	60	60	46	27	59	55	28	27	96	4	30	29	97	3	63	52
4	1963-64 ...	60	60	48	26	54	57	25	25	100	..	...	..	..	...	..	...

NOTE—(1) The information filled under First, Second, and Final year, is for batches admitted in the academic session indicated in column 2.

(2) Except for information in column 4, rest of the figures are based on the information available in the office of the Board of Technical Education.

(3) Information in column 4 is based on datae collected from the institutions.

(4) Average rate of wastage comes to 52 per cents (col. 18).

APPENDIX 3.5.1

(SHOWING POSITION OF WASTAGE IN DIPLOMA COURSE IN CIVIL ENGINEERING AT THE UNIVERSITY POLYTECHNIC, MUSLIM UNIVERSITY, ALIGARH)

Serial Number	Batch admitted in First year in the session	Sanctioned Intake	First year					Second year					Final year					Overall Pass Percentage $\left(\frac{16}{4}\times 100\right)$	Overall Wastage $\left(\frac{3-16}{3}\right)\times 100$
			Number of students admitted	Number appeared in the Examination	Number passed including Supplementary	Pass Percentage $\frac{6\times 100}{5}$	Wastage $\left(\frac{8-6}{3}\right)\times 100$	Number of students admitted	Number of students appeared	Number passed including Supplementary	Pass Percentage $\left(\frac{11}{10}\times 100\right)$	Wastage $\left(\frac{9-11}{9}\right)\times 100$	Number of students admitted	Number appeared	Number passed including Supplementary	Pass Percentage $\left(\frac{16}{15}\times 100\right)$	Wastage $\left(\frac{14-16}{14}\right)\times 100$		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	1960-61 ..	120	124	109	70	64	42	70	65	60	92	14	60	60	58	97	3	47	51
2	1961-62 ..	120	124	110	78	71	35	78	70	69	99	12	69	69	63	91	8	51	47
3	1962-63 ..	120	120	110	93	84	22	93	69	66	96	30	66	63	48	73	24	40	60

NOTE—(1) The information filled under First, Second and Final year is for batches admitted in the academic session indicated in column 2.

(2) The difference in column 9 and 10 is on account to transfer of students to Elect./Mech. Engg. Branches.

(3) The information is compiled on the basis of letter no. 99, dated April 7, 1966.

(4) The average overall wastage comes to 53 per cent (col. 20).

APPENDIX 3.5.2

(SHOWING POSITION OF WASTAGE IN DIPLOMA COURSE IN ELECTRICAL ENGINEERING AT THE UNIVERSITY POLYTECHNIC, MUSLIM UNIVERSITY, ALIGARH)

Serial number	Batch admitted in First Year in the sessions	Sanctioned Intake	First year				Second year					Final year						Overall pass percentage $\left(\frac{16}{4}\times 100\right)$	Overall Wastage $\left(\frac{3-16}{3}\right)\times 100$
			Number of students admitted	Number appeared in the examination	Number passed including Supplementary	Pass percentage $\frac{6\times 100}{5}$	Wastage $\left(\frac{3-6}{3}\right)\times 100$	Number of students admitted	Number of students appeared	Number passed including supplementary	Pass percentage $\left(\frac{11}{10}\times 100\right)$	Wastage $\left(\frac{9-11}{9}\right)\times 100$	Number of students admitted	Number appeared	Number passed including supplementary	Pass percentage $\left(\frac{16}{15}\times 100\right)$	Wastage $\left(\frac{14-16}{14}\right)\times 100$		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	1960-61 ...	60	63	57	42	74	30	42	43	42	98	Nil	42	38	35	92	17	56	42
2	1961-62 ..	60	63	58	45	78	25	45	46	46	100	Nil	46	45	45	100	2	71	25
3	1962-63 ..	60	60	52	36	69	40	36	43	38	88	Nil	38	38	30	79	21	50	50

NOTES—(1) The information filled under First, Second and Final year is for batches admitted in the academic session indicated in column 2.

(2) The increase in second year in col. 10 is on account of transfer from other courses.

(3) The information is compiled on the basis of letter no. 99 dated 7th April, 1966.

(4) The average over all wastage comes to 39 percent (col. 20).

APPENDIX 3.5.3

(SHOWING POSITION OF WASTAGE IN THE DIPLOMA COURSE IN MECHANICAL ENGINEERING AT THE UNIVERSITY POLYTECHNIC, MUSLIM UNIVERSITY, ALIGARH)

Serial Number	Batch admitted in First year in the session	Sanctioned Intake	First Year					Second Year					Final Year					Overall pass percentage $\left(\frac{16}{4}\times 100\right)$	Overall wastage $\left(\frac{3-16}{3}\right)\times 100$
			Number of students admitted	Number appeared in the examination	Number passed, including Supplementary	Pass Percentage $\frac{6\times 100}{5}$	Wastage $\left(\frac{3-6}{3}\right)\times 100$	Number of students admitted	Number of students appeared	Number passed including supplementary	Pass percentage $\left(\frac{11}{10}\times 100\right)$	Wastage $\left(\frac{9-11}{9}\right)\times 100$	Number of students admitted	Number appeared	Number passed including Supplementary	Pass percentage $\left(\frac{16}{15}\times 100\right)$	Wastage $\left(\frac{14-16}{14}\right)\times 100$		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	1960-61 ...	60	63	59	41	69	32	41	42	38	94	7	38	42	42	100	Nil	67	30
2	1961-62 ..	60	63	58	49	84	18	49	50	47	94	4	47	47	46	98	2	73	23
3	1962-63 ..	60	60	54	43	80	28	43	54	49	91	Nil	49	46	46	100	6	77	23

NOTES—(1) The information filled under First, Second and Final year is for batches admitted in the academic session indiciated in cloumn 2.

(2) The increase in column 10 under Second year is on account of transfer from other courses.

(3) The information is compiled on the basis of letter no. 99, dated the 7th April, 1966.

(4) Average over all wastage comes to 25 per cent (col. 29).

APPENDIX 3.6.1

(SHOWING POSITION OF WASTAGE IN THE DIPLOMA COURSE IN CIVIL ENGINEERING AT THE DIPLOMA POLYTECHNIC, UNIVERSITY OF ROORKEE, ROORKEE)

Serial number	Batch admitted in First year in the session	Sanctioned Intake	First Year					Second Year				Final Year					
			Number of students admitted	Number appeared in the Examination	Number passed including Supplementary	Pass percentage $\frac{6\times100}{5}$	Wastage $\left(\frac{3-6}{3}\right)\times100$	Number of students appeared	Number passed including Supplementary	Pass percentage $\left(\frac{10}{9}\times100\right)$	Wastage $\left(\frac{9-10}{9}\right)\times100$	Number appeared	Number passed including Supplementary	Pass percentage $\left(\frac{14}{13}\times100\right)$	Wastage $\left(\frac{13-14}{13}\right)\times100$	Overall pass percentage $\left(\frac{14}{4}\times100\right)$	Overall Wastage $\left(\frac{3-14}{3}\right)\times100$
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	1960-61 ..	120	113	113	96	85	20	96	92	96	4	101	98	98	3	87	10
2	1961-62 ..	120	125	134	125	93	..	129	124	96	4	126	123	98	2	98	10
3	1962-63 ...	120	119	118	112	95	7	112	106	95	5	108	91	84	16	76	30

NOTES—(1) The information to be filled under First, Second and Final year is for batches admitted in the academic session indicated in column 2.

(2) Average overall wastage comes to 17 per cent (col. 18).

APPENDIX 3.6.2

(SHOWING POSITION OF WASTAGE IN THE DIPLOMA COURSE IN ELECTRICAL ENGINEERING AT THE DIPLOMA POLYTECHNIC, UNIVERSITY OF ROORKEE, ROORKEE)

Serial number	Batch admitted in First Year in the session	Sanctioned intake	First Year					Second Year				Final Year				Overall pass percentage $\left(\frac{14}{4}\times 100\right)$	Overall wastage $\left(\frac{3-14}{3}\right)\times 100$
			No. of students admitted	No. appeared in the examination	No. passed including Supplementary	Pass percentage $\frac{6\times 100}{5}$	Wastage $\left(\frac{3-6}{3}\right)\times 100$	No. of students appeared	No. passed including Supplementary	Pass percentage $\left(\frac{10}{9}\times 100\right)$	Wastage $\left(\frac{9-10}{9}\right)\times 100$	No. appeared	No. passed including Supplementary	Pass percentage $\left(\frac{14}{13}\times 100\right)$	Wastage $\left(\frac{13-14}{13}\right)\times 100$		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	1960-61	60	50	50	44	88	27	46	43	93	7	44	44	100	...	88	27
2	1961-62	60	67	63	58	92	2	59	54	95	8	58	56	96	3	81	7
3	1962-63	60	65	66	62	94	Nil	61	52	85	15	53	52	98	2	80	13

NOTES—(1) The information to be filled under First, Second and Final year is for batches admitted in the academic session indicated in column 2.

(2) Average overall wastage comes to 16 per cent. (col. 18).

APPENDIX 3.6.3

(SHOWING POSITION OF WASTAGE IN THE DIPLOMA COURSE IN MECHANICAL ENGINEERING AT THE DIPLOMA POLYTECHNIC, UNIVERSITY OF ROORKEE, ROORKEE)

Serial number	Batch admitted in First Year in the session	Sanctioned intake	First Year					Second Year				Final Year					
			No. of students admitted	No. appeared in the examination	No. passed including Supplementary	Pass percentage $\frac{6 \times 100}{6}$	Wastage $\left(\frac{3-5}{3}\right) \times 100$	No. of students appeared	No. passed including Supplementary	Pass percentage $\left(\frac{10}{9} \times 100\right)$	Wastage $\left(\frac{9-10}{9}\right) \times 100$	No. appeared	No. passed including Supplementary	Pass percentage $\left(\frac{14}{13} \times 100\right)$	Wastage $\left(\frac{13-14}{13}\right)$	Overall pass percentage $\left(\frac{14}{4} \times 100\right)$	Overall wastage $\left(\frac{3-14}{3}\right) \times 100$
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	1960-61 ..	60	59	59	53	90	11	52	46	88	12	48	46	96	4	78	23
2	1961-62 ..	60	61	62	61	98	..	64	61	95	5	65	65	100	..	100	..
3	1962-63 ..	60	64	57	55	97	8	59	59	100	..	58	58	100	..	91	3

NOTES—(1) The information filled under First, Second and Final Year is for batches admitted in the academic session indicated in column 2.

(2) Average overall wastage comes to 9 percent. (col. 18).

APPENDIX 4

SHOWING ANALYSIS OF RESULTS INSTITUTION-WISE COVERING DIPLOMA INSTITUTIONS IN WHICH THE RESULT WAS LESS THAN 60 PER CENT, 70 PER CENT AND 80 PER CENT IN FIRST, SECOND AND FINAL YEAR RESPECTIVELY (IN ANY YEAR)

Serial number	Class	Examination year	Course	Name of Institution																	
				Govt. Polytechnic, Bareilly	P. M. V. Polytechnic, Mathura	Govt. Polytechnic, Jhansi	Allahabad Polytechnic, Allahabad.	M. P. Polytechnic, Gorakhpur	Technical College, Dayalbagh, Agra.	Nainital Polytechnic, Nainital Tal	Gandhi Polytechnic, Muzaffarnagar	D. N. Polytechnic, Meerut	Chandauli Polytechnic, Chandauli	Town Polytechnic, Ballia	M. G. Polytechnic, Hathras'	Handia Polytechnic, Handia	D.J. Polytechnic, Baraut	Lucknaw Polytechnic, Lucknow	Govt. Polytechnic, Gorakhpur	S. G. S. J. Polytechnic, Khurja	Govt. polytechnic, Lucknow
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1	First year	1961	Civil.	43	11	33	30*	39	...	59	57	...	..	Result cancelled	..	..	57	..	51	..	..
			Elect.	..	56	54	...	..	44	..	..	..	..	..	39	..	...	..	...	..	..
			Mech.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
		1962	Civil	..	42	50	..	34	..	49	46	48	45	44	..	..	52	52	..	..	..
			Elect.	..	43	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
			Mech.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
		1963	Civil	..	52	54	..	59	...	57	44	44	54	29	40	33	51	..	..	..	..
			Elect.	58	..	..	..	..	..	..	33	27	..	..	50	33	29	..	..	..	..
			Mech.	..	..	..	..	..	..	..	43	..	..	..	..	59	44	56	..	..	..
		1964	Civil	..	..	..	..	..	..	49	..	59	52	..	48	..	..	49	57	..	..
			Elect.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
			Mech.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
		1965	Civil	56	41	..	..	56	...	2 year course.	..	..	59	47	..	52	35	58	...	43	2 year course.
			Elect.	...	..	59		...	..	do	..	..	57	..	..	51	40	..	..	..	do
			Mech.	..	..	..	..	...	..	do.	..	..	.	..	...	52	46	..	..	..	do.

APPENDIX 4 – (*continued*)

Serial number	Class	Examination year	Course	Govt. Polytechnic, Bareilly	P. M. V. Polytechnic, Mathura	Govt. Polytechnic, Jhansi	Allahabad Polytechnic, Allahabad	M. P. Polytechnic, Gorakhpur	Technical College, Dayalbagh, Agra	Naini Tal Polytechnic, Naini Tal	Gandhi Polytechnic, Muzaffarnagar	D. N. Polytechnic, Meerut	Chandauli Polytechnic, Chandauli	Town Polytechnic, Ballia	M. G. Polytechnic, Hathras	Handia Polytechnic, Handia	D. J. Polytechnic, Baraut	Lucknow Polytechnic, Lucknow	Govt. Polytechnic, Gorakhpur	S. G. S. J. Polytechnic, Khurja	Govt. Polytechnic, Lucknow
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
2	Second Years	1962	Civil.	..	..	..	..	62	..	..	..	..	63	67	..	..	62	..	..	..	..
			Elect.	..	..	22	..	..	65	..	..	..	..	..	43	..	..	..	..	..	..
			Mech	..	..	..	..	..	..	..	..	..	..	..	47	..	..	..	..	..	..
		1963	Civil.	..	..	67	..	..	..	..	62	54	..	61	69	..	64	..	..	..	60
			Elect.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
			Mech.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
		1964	Civil.	..	..	..	52	61	..	..	..	..	..	..	66	67	..	..	52	..	62
			Elect.	..	..	..	65	..	..	..	..	..	..	..	..	67	43	..	..	..	..
			Mech.	..	..	..	60	..	..	63	..	..	..	..	..	..	..	..	..	..	..
		1965	Civil.	..	..	..	..	..	..	..	69	..	..	..	..		64	..	..	..	51
			Elect.	..	..	63	..	..	..	..	60	..	..	..	..	..	63	..	..	..	..
			Mech.	..	..	..	..	..	..	..	65	..	..	..	..	..	63	..	..	..	65
3.	Final year	1963	Civil	63	..	..	70	..	61	..	..	..	73	75	..	..	..	78	66	..	..
			Elect	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..
			Mech.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
		1964	Civil	..	..	..	..	..	..	..	61	..	62	..	67	..	..	76	69	72	..
			Elect.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
			Mech.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
		1965	Civil.	74	..	..	..	..	..	..	..	..	..	..	71	..	..	..	..	..	..
			Elect.	..	..	76	..	..	..	..	..	..	..	..	..	..	..	56	..	..	77
			Mech.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

NOTES—(1) Institutions set up in 1964 and afterwards have not been considered
(2) In case of an institute where only in one or two cases the results have been below the assumed limits, they have been ignored.
(3) The assumed limits are not below (i) 60 per cent in First year, (ii) 70 per cent in Second year and (iii) 80 per cent in the Final year.

APPENDIX 5

(SHOWING SHORTAGE OF STAFF IN DEGREE INSTITUTIONS)

Serial Number	Name of Institution	No. of posts as sanctioned on 1st March, 1966	No. of posts as stood filled on 1st March, 1966	No. of posts vacant on 1st March, 1966	Percentage of posts vacant
1	2	3	4	5	6
1.	Madan Mohan Malviya Engineering, College, Gorakhpur.	54	47	7	13%
2.	Motilal Nehru Engineering, College, Allahabad.	106	74	32	30%
3.	Banaras Hindu University:				
	(*a*) College of Mining and Metallurgy:				
	(i) Mining Department.	18	17	1	
	(ii) Metallurgy Department.	35	28	7	
		53	45	8	15%
	(*b*) College of Technology:				
	(i) Chemical Engineering.	33	20	13	
	(ii) Silicate Technology.	14	8	6	
	(iii) Pharmaceutics.	17	12	5	
		64	40	24	37.5%
	(*c*) College of Engineering.	198††	133	65	33%
4.	Allahabad Agriculture Institute, Allahabad.	19	19	—	0%
5.	Government Central Textile Institute, Kanpur.	38†††	25	13	34%
6.	Indian Institute of Technology, Kanpur.	362	271	91	25%
7.	Engineering College, Dayalbagh, Agra.	24	20	4	17%
8.	Roorkee University, Roorkee.				
	(i) Civil Engineering.	62	57	5	
	(ii) Electrical Engineering.	33	18	15	
	(iii) Mechanical Engineering.	45	35	10	
	(iv) Electronics and Tele-Com. Engg.	16	14	2	
	(v) Architecture.	12	11	1	
		168	135	33	20%
9.	Aligarh Muslim University, Aligarh.				
	(i) Civil Engineering.	29	20	9	
	(ii) Electrical Engineering.	32	23	9	
	(iii) Mechanical Engineering.	51	38	13	
		112	81	31	27.7%††††
10.	H. B. Technological Institute, Kanpur.	111†	59	52	47%
	Total	1309	949	360	27.5% say 28%

† Posts only up to the instructor level have been included.

†† Excludes special staff sanctioned for the Post-Graduate course.

††† The posts are inclusive of degree and diploma section.

†††† These posts were not vacant for want of suitable qualified persons but are to be filled in future progressively according to the phased programme.

APPENDIX 6

(SHOWING SHORTAGE OF STAFF IN DIPLOMA INSTITUTIONS)

Serial Number	Name of Institution	No. of posts sanctioned as on 1st March, 1966.	No. of posts as stand filled on 1st March, 1966.	No. of posts vacant on 1st March, 1966.	Percentage of posts vacant
1	2	3	4	5	6
	A—Civil, Electrical and Mechanical Engineering†				
1.	Naini Tal Polytechnic, Naini Tal	49	45	4	8
2.	Government Polytechnic, Bareilly	47	38	9	19
3.	K. L Polytechnic, Roorkee	51	49	2	4
4.	Gandhi Polytechnic, Muzaffarnagar	40	34	6	15
5.	D. N. Polytechnic, Meerut	49	42	7	14
6.	D. J. Polytechnic, Baraut (Meerut)	39	35	4	9
7.	P. M. V. Polytechnic, Mathura	49	44	5	10
8.	M. G. Polytechnic, Hathras	49	43	6	12
9.	Seth Ganga Sagar Jatia Polytechnic, Khurja	41	37	4	10
10.	Government Polytechnic, Kanpur	56	51	5	9
11.	Government Polytechnic, Jhansi	50	41	9	18
12.	Allahabad Polytechnic, Allahabad	53	52	1	2
13.	Handia Polytechnic, Handia	39	37	2	5
14.	Chandauli Polytechnic, Chandauli	41	31	10	24
15.	Government Polytechnic, Gorakhpur	74	60	14	19
16.	Government Polytechnic, Lucknow	77	73	4	5
17.	M. P. Polytechnic, Gorakhpur	35	30	5	14
18.	Town Polytechnic, Ballia	30	13	17	57
19.	Hewett Polytechnic, Lucknow	60	52	8	13
20.	Lucknow Polytechnic, Lucknow	53	45	8	15
21.	Technical College, Dayalbagh, Agra	36	32	4	11
22	Government Polytechnic, Faizabad	38	34	4	12
23.	Government Polytechnic, Mirzapur	34	25	9	26
24.	Government Polytechnic, Moradabad	39	30	9	23
25.	Government Polytechnic, Gonda	27	22	5	18
26.	Government Polytechnic, Basti	28	24	4	14
27.	Government Polytechnic, Arya Nagar Settlement, Lucknow.	40	31	9	23
28.	Diploma Polytechnic, Muslim University, Aiigarh	77	74	3	4
	Total	1,301	1,124	177	13·6 =say 14%

†Excludes Government Polytechnic, Azamgarh,

1	2	3	4	5	6
	B—Other courses				
1.	Northern Regional Institute of Printing Technology, Allahabad.	63	51	12	19
2	Government Leather Institute, Agra	12	8	4	33
3.	Technical College, Dayalbagh, Agra (Automobile Engineering)	6	5	1	17
4.	School of Paper Technology, Saharanpur	53	25	28	53
5.	Government Leather Institute, Kanpur	27	25	2	7
6.	Government Girls' Polytechnic Lucknow	19	15	4	21
7.	Government Central Textile Institute, Kanpur†	38	25	13	34
8.	Government College of Arts and Crafts, Lucknow	9	6	3	33
	Total	227	160	67	29·5
					= say 30%

†Includes Degree Section also.

APPENDIX 7

(SHOWING ADMISSION CAPACITY IN DEGREE COURSES AT THE END OF THE THIRD PLAN (1965-66))

Serial number	Name of the course	Name of Institutions: State Institutions: Roorkee University, Roorkee	H. B. T. I., Kanpur	Engineering College, Dayalbagh, Agra	M. N. R. E. C, Allahabad	M. M. M. Engg. College, Gorakhpur	U. P. Agricultural University, Pantnagar (College of Agricultural Engg.)	Allahabad Agriculture Institute, Allahabad	Government Central Textile Institute, Kanpur	Total	Central Institutions: B. H. U. Varanasi (Colleges of Engg., Mining and Metallurgy and Technology)	Aligarh Muslim University, Aligarh (College of Engg. and Tech.)	I. I. T., Kanpur	Total	Grand Total
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Civil Engineering	120+60†	..	..	70	30	..	..	..	280	100	60	60	220	500
2	Electrical Engg.	90	25	30	90	45	..	..	..	280	125	90	60	275	555
3	Mech. Engg. ..	90	25	30	90	45	..	..	..	260	125	90	60	275	555
	Total ..	360	50	60	250	120	..	..	..	840	350	240	180	770	1610

4	Chem. Engg. ..	30	60	..	..	..	..	..	..	90	60	..	50	110	200
5	Silicate Tech., Chem Tech. and Pharmacy.	75††	..	..	..	..	..	..	..	75	30†††	..	..	30	127
											22††††			22	
6	Mining	..	..	..	..	..	..	..	..	..	40	..	..	40	40
7	Metallurgical Engg.	60	..	..	..	..	..	..	..	60	60	..	50	110	170
8	Tele-Communication Engg.	30+30†	..	..	..	..	..	..	..	60	..	..	..	..	60
9	Architecture.	30	..	..	..	..	..	..	..	30	..	..	..	..	30
10	Agriculture Engg.	..	..	..	..	..	75	40	..	115	..	..	..	..	115
11	Textile Tech. and Textile Chem.	..	..	..	..	..	..	..	30	30	..	..	..	..	30
12	Aeronautical Engg.	..	..	..	..	..	..	..	..	..	..	..	20	20	20
	Grand Total ..	540	135	60	250	120	75	40	30	1300	532	240	200	1102	2402

† 3 years course.
†† In different fields of Chemical Technology.
††† Silicate Technology.
†††† Pharmacy.

APPENDIX 8

(SHOWING DETAILS OF FACILITIES AT THE DIPLOMA LEVEL IN THE STATE IN CIVIL, ELECTRICAL AND MECHANICAL ENGINEERING FROM 1960-61 TO 1965-66)

Serial Number	Session	Civil Engingering						Electrical Engineering					Mechanical Engineering					Grand Total (8+13+19)	Grand total (3+9+14) i. e. institutions under Directorate of Technical Education, U. P.
		Institutions under the Directorate of Technical Education, U. P.	Diploma Polytechnic, Roorkee University, Roorkee	University Polytechnic, Aligarh Muslim University, Aligarh	Balwant Vidyapeeth Instt. of Rural Higher Education, Bichpuri, Agra	Government Polytechnic, Aryanagar Settlement, Lucknow	Total	Institutions under the Directorate of Technical Education, U. P.	Diploma Polytechnic, Roorkee University, Roorkee	University Polytechnic, Aligarh Muslim University, Aligarh	Government Polytechnic, Aryanagar Settlement, Lucknow	Total	Institutions under the Directorate of Technical Education U. P.	Diploma Polytechnic, Roorkee University, Roorkee	University Polytechnic, Aligarh Muslim University, Aligarh	Government Polytechnic Aryanagar Settlement, Lucknow	Total		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	1960-61	1280	120	120	60	..	1580	330	60	60	..	450	330	60	60	..	450	248	1940
2	1961-62	1170	120	120	60	..	1470	420	60	60	..	540	420	60	60	..	540	2550	2010
3	1962-63	1095	120	120	60	..	1390	665	60	60	..	785	670	60	60	..	790	2965	2330
4	1963-64	1040	120	120	60	..	1340	1295	60	60	..	1415	1295	60	60	..	1415	4170	3630
5	1964-65	1240	..	120	60	..	1420	1435	..	60	..	1495	1435	..	60	..	1495	4430	4110
6	1965-66	1280	..	120	60	20	1480	1535	..	60	20	1615	1535	..	60	20	1615	4710	4350

Note—Admissions in Diploma Polytechnic, Roorkee University, Roorkee were closed from 1964-65.
† The Course is Civil and Rural Engineering.

APPENDIX 9

(SHOWING INTAKE FOR VARIOUS DEGREE COURSES DURING THE THIRD PLAN)

Serial no.	Name of Institution	Name of Course	1961-62	1962-63	1963-64	1964-65	1965-66
1	2	3	4	5	6	7	8
1	Motilal Nehru, Regional Engg. College, Allahabad.	Civil. Elect. and Mech. Engg.	100	100	250	250	250
2	Roorkee University, Roorkee.	Chem. Engg.	..	..	30	30	30
		Metallurgy		..	30	30	30
		Civil Engg.,	120	120	120	120	120
		Elect. Engg.	60	60	60	60	90
		Mech. Engg.	60	60	60	60	90
		Tele-Communication Engg.	30	30	30	30	30
		Architecture	30	30	30	30	30
3	H. B. Technological Institute, Kanpur.	Elect. and Mech. Engg.	..	..	..	50	50
		Chem. Engg.	30	30	30	60	60
		Chem. Tech. in different specialities.	8	8	8	75	75
4	Banaras Hindu, University Varanasi.	Civil, Elect. and Mech. Engg.	270	270	350	350	350
	(Colleges, of Engg, Mining and Metallurgy and Technology.)	Mining and Metallurgical Engg.	100	100	100	100	100
		Chem. Engg.	30	30	30	60	60
		Silicate Tech.	30	30	30	30	30
		Pharmacy	22	22	22	22	22
5	Aligarh Muslim University, Aligarh College, of Engg. and Technology.	Civil, Elect. and Mech. Engg.	120	120	120	120	240
6	Indian Institute, of Technology, Kanpur.	Civil, Elect. Mech and Chem, Engg. Metallurgical Engg., Aeronautical† Engg.	100	100	200	250	250
7	Engineering College, Dayalbagh Agra.	Mech. and Elect. Engg.	60	60	60	60	60
8	Madan Mohan Malviya Engineering College, Gorakhpur.	Civil, Elect. and Mech. Engg,	..	..	60	60	60
9	U. P. Agriculture University, Pantnagar.	Agriculture Engg.	..	75	75	75	75
10	Govt. Central Textile Institute, Kanpur.	Textile Chemistry and Textile Technology.	30	30	30	30	30
11	Allahabad Agriculture Institute Allahabad.	Agriculture Engg.	40	40	40	40	40
	Total		1240	1315	1765	1992	2252

† Aeronautical Engg. was added at I. I. T. Kanpur in 1961-62.

Correction:- For correct figures of 1965-66 see **Appendices 1, 1 and 7.**

APPENDIX 10.1

(SHOWING ANNUAL ADMISSION CAPACITY APPROVED IN THE THIRD PLAN *VIS-A-VIS* FACILITIES PROVIDED IN THE STATES BY 1965-66: DEGREE COURSES— ALL INDIA POSITION).

States	Full-time courses		Part-time courses		Total		To be implemented in the IV Plan		
	Approved in the III Plan	Provided in 1965-66	Approved in the III Plan	Provided in 1965-66	Approved in the III Plan	Provided in 1965-66	Full time courses	Part time courses	Total
1	2	3	4	5	6	7	8	9	10
Andhra Pradesh ..	1760	1730	280	80	2040	1810	302	200	230
Assam ..	640	390	200	..	840	390	2503	200	450
Bihar ..	1495	1435	200	..	1695	1435	604	200	260
Gujrat ..	1601	1601	200	..	1801	16011	..	200	200
Jammu and Kashmir ..	250	250	..	..	250	250	..	..	..
Kerala ..	1300	1240	200	..	1500	1240	605	200	260
Madhya Pradesh ..	1700	1700	200	..	1900	1700	..	200	200
Madras ..	2315	2245	200	..	2515	2245	706	200	270
Maharashtra ..	2230	2230	260	60	2490	2290	..	200	200
Mysore ..	2540	2380	200	..	2740	2380	1607	200	360
Orisa ..	490	490	200	..	690	490	..	200	200
Punjab ..	1265	1145	200	..	1465	1145	1208	200	320

Rajasthan	..	1010	950	200	..	1210	950	609	200	260
Uttar Pradesh	..	1500	1380	200	..	1700	1380	12010	200	320
West Bengal	..	1658	1558	320	120	1978	1678	10011	200	300
Union Territories	..	490	370	120	120	610	490	12012	..	120
Central Institutions	..	3119	3069	30	30	3149	3099	5013	..	50
Total	..	25363	24163	3210	410	28573	245731	1200	2800	4000

1. Excludes 120 seats provided in 1965-66 for introduction of the 5-year integrated degree courses; these would be merged with the admission capacity at present provided for the 3-year degree courses.
2. Three year degree course at post-B. Sc. level, approved at the Department of Technology, Andhra University, Waltair.
3. Regional Engineering College.
4. Three year degree course at post-B. Sc. level, approved at Bihar Institute of Technology, Sindri.
5. Three year degree course at post-B. Sc. level, approved at the College of Engineering, Trichur.
6. Three year degree courses at Post-B. Sc. level, approved at (a) A. C. College of Engineering and Technology, Karaikudi (40 seats) and (b) A. C. College of Technology, Madras (30 seats).
7. Three year degree courses at post B. Sc. level, approved at(a) B. M. S. College of Engineering, Bangalore (60 seats); (b) University College of Engineering, Bangalore (60 seats) and (c) National Institute of Engineering, Mysore (40 seats).
8. Private engineering college at Faridabad to be set up by Kothari Foundation.
9. Three year degree course at post B. Sc. level, approved at the Faculty of Engineering, Jodhpur University, Jodhpur.
10. Pant Memorial Engineering College, agreed to in principle, by the Ministry of Education.
11. Three year degree courses at post-B. Sc. level, approved (a) Bengal Engineering College, Howrah, (50 seats); (b) Institute of Radio Physics and Electronics, Calcutta (20 seats) and (c) Department of Applied Chemistry (30 seats). The admission capacity for these courses is estimated. These courses are to be organised after the reorganisation of existing courses.
12. College of Engineering, Goa.
13. Indian Institute of Technology, Delhi. The ultimate admission capacity is assumed to be 320 students as against 270 in 1965-66.

SOURCE:—Copy of Appendix I of Item No. 7 technical Education in the Fourth Plan—Approach and Tasks (a note prepared jointly by the Planning Commission (Education Division), Ministry of Education and Directorate of Manpower, Ministry of Home affairs) received, in state Government with letter No. F. 19-49/66—T. S., dated 13/14 September, 1966 from the Government of India, Ministry of Education.

APPENDIX 10·2

(SHOWING ANNUAL ADMISSION CAPACITY APPROVED IN THE THIRD PLAN *VIS-A-VIS* FACILITIES PROVIDED IN THE STATES BY 1965-66: DIPLOMA COURSES—ALL INDIA POSITION).

States	Full-time Courses				Part-time Course		Total		To be implemented in the IV Plan			
	General Polytechnics		Girls Polytechnics						Full-time		Part-time	Total
	Approved	Provided	Approved	Provided	Approved	Provided	Approved	Provided	General Polytechnic	Girls Polytechnic		
1	2	3	4	6	5	7	8	9	10	11	12	13
Andhra Pradesh	3105	3105	350	350	240	240	3695	3695	..	..	..	..
Assam	1290	890	60	60	100	100	1450	1050	4002	..	..	400
Bihar	2915	2515	200	..	240	40	3355	2555	4003	2009	200	800
Gujrat	2755	2755	180	180	200	200	3135	3135	..	..	..	..
Jammu and Kashmir	240	240	..	..	..	..	240	240	..	..	..	..
Kerala	2420	2420	270	270	320	320	3010	3010	..	..	..	..
Madhya Pradesh	3352	3352	60	60	480	480	3892	3892	..	..	..	..
Madras	4365	4365	230	230	235	235	4830	4830	..	..	..	..
Maharashtra	4401	4401	..	..	250	50	4651	4451	..	..	200	200
Mysore	4135	4135	240	240	100	..	4475	4375	..	..	100	100
Orissa	1555	1375	..	..	..	..	1555	1375	1804	..	..	180
Punjab	3300	3160	150	150	160	460	3610	3470	1405	..	..	140

Rajasthan	1550	1280	..	..	..	..	1550	1280	2706	..	..	270
Uttar Pradesh	5510	5030	80	80	260	160	5850	5270	4807	..	100	580
West Bengal	5220	4680	260	60	885	885	6365	5625	5408	2009	..	740
Union Territories	1475	1475	175	175	..	..	1650	1650	..	..	..	..
Total	47588	45178	2255	18551	3470	2870	53313	49903	2410	400	600	3410

1. Includes 1,230 seats for courses in Secretarial/Commercial Practice; Library Science; Interior Decoration and Display; Costume Design and Dress Making; Catering and Food Technology and Pharmacy.
2. Polytechnics at Shillong (180), Dibrugarh (180) and Assam Textile Institute, Gauhati (40).
3. Two Polytechnics (location not finalised) and Leather Institute, Bettiah (40).
4. School of Engineering, Bolangir or Khurda (location not finalised).
5. Two sandwich polytechnics (one at Faridabad) (100) and Tanning Institute, Rewari (40).
6. Polytechnics at Jaipur (150) and Bharatpur (120).
7. Polytechnics at Azambarh (120), Srinagar—Garhwal and (120), Ferozabad (120) and Ghaziabad (120).
8. Polytecnic at Tindhoria (180), South Howrah (180) and Raldia (180).
9. Annual admission capacity is assumed as 100 in each and of the girls' polytechnics yet to be started.

SOURCE—Copy of Appendix II of Item No. 7 Technical Education in the Fourth Plan-Approach and Tasks (a note prepared jointly by the Planning Commission (Education Division), Ministry of Education and Directorate of Manpower, Ministry of Home Affairs) received, in State Government with letter No. F-19-49-66 T. S., dated 13/14th September, 1966 from the Government of India, Ministry of Education.

The data included in this study has been collected and compiled in the office of the Secretary, Board of Technical Education, U. P., Lucknow.

REFERENCES

1. A Preliminary Report on Wastage in Technical Education—Manpower Studies No. 13—Perspective Planning Division, Planning Commission, Government of India (May 1959), pages 4, 7 (Table 3), 9, 17.

2. Student Wastage in Engineering Educational Institutions (completed study)—Manpower Group Survey (Engineering)—IAMR Working Paper No. 13/1965. Institute of Applied Manpower Research, New Delhi (1965) pages (ii)—(iii), 11.

3. Fourth Five-Year Plan of Technical Education—A Draft Report—by Sri L. S. Chandrakant, Joint Educational Adviser, Ministry of Education, Government of India, New Delhi, (1965) pages 4, 15, 24, 28, 29, 132, 134.

4. Proceedings of the Seminar on Technical Education and its Development (1966—81)—The Institution of Engineers (India), (1965), pages 109-110, 124, 471.

5. Man-Power in Uttar Pradesh—A Fact Book, published by Planning Department, Government of U. P. (1965) page 120.

6. Technical Education in Uttar Pradesh, (1966) pages 1, 2, 8, 26, 33.

7. Facilities for Technical Education in India—Vol. I and II (combined)—Ministry of Education, Government of India, (1965) pages 98—113 (Vol. II).

8. Review of Engineering Educational Institutions in India—Manpower Group Survey (Engineering)—I. A. M. R. Working Paper No. 9/1964—Institute of Applied Manpower Research (1964), pages 104—106, 110—122, 131, 136-137, 140, 144.

9. Report of the Engineering Personnel Committee (1956), page 24.

10. Fact book on Manpower—Part III—I. A. M. R. Report No. 1/1963—Published by the Institute of Applied Manpower Research (1963), pages 162, 170 (Tables 11·9 and 11·10).

11. Engineering Manpower—Analytical Review of Demand Forecast Methodology and Provisional Forecast of Growth (Part I)—I. A. M. R. Working Paper No. 7/1963 Part I—Manpower Group Survey—Institute of Applied Manpower Research (1963), pages 11.

12. Report of the Education Commission (1964—66)—Chapter XV—Vocational, Technical and Engineering Education, Ministry of Education, Government of India (1966), pages 15 (para 15·20), 28 (para 15·43), 30 (para 15·45), 43 (para 15·65).

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