

**Report of the
Reviewing Committee
of
Indian Institute of Technology
Kanpur**

**Ministry of Education & Social Welfare
Government of India**

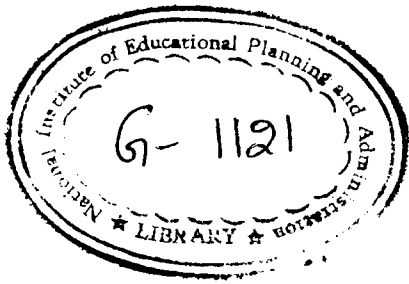


8 March 1973

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**Chairman's Letter forwarding the Report of the Reviewing Committee
to the President of India**

Bangalore, 8th March, 1973

From

**Dr. S. Bhagavantam,
525, Raj Mahal Extensions,
Bangalore-560006
(Chairman, Reviewing Committee,
Indian Institute of Technology, Kanpur)**

To

**The President of India,
New Delhi.**

Mr. President,

I have the honour to forward herewith the Report of the Reviewing Committee appointed in terms of the Ministry of Education & Youth Services, Government of India, Resolution No. F. 5-11/68-T. 6, dated the 31st March, 1970, to review the work and progress of the Indian Institute of Technology, Kanpur, since its inception in 1960.

**I have the honour to be,
Mr. President,
Yours faithfully,
(Sd.) S. Bhagavantam
Chairman**

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CHAPTER—1

INTRODUCTION

1.1 The President of India, in his capacity as the Visitor of the Institute, has appointed a Reviewing Committee to review the working of the Indian Institute of Technology, Kanpur with the composition and with terms of reference as below :—

- | | |
|---|----------|
| 1. Dr. S. Bhagavantam,
525, Raj Mahal Extensions,
Bangalore-6. | Chairman |
| 2. Dr. V. Ranganathan,
Chief (Science)
Planning Commission,
Yojana Bhawan,
Parliament Street,
New Delhi. | Member |
| 3. Dr. R. Narasimhan,
Computer Installation,
Tata Institute of Fundamental Research,
Colaba,
Bombay-5. | Member |
| 4. Dr. Jagdish Lal,
Principal,
Motilal Nehru Regional Engg. College,
Allahabad. | Member |
| 5. Rai Bahadur Gujarmal Modi,
Chairman,
Modi Enterprises,
Modinagar,
Distt : Meerut (U. P.) | Member |

6. Shri S. Sadasivam,
Dy. Educational Adviser (Technical),
Govt. of India.
Ministry of Education & Social Welfare,
Northern Regional Office,
7/169, Swarupnagar,
Kanpur.

Secretary

1.2 The above Reviewing Committee was appointed under Government of India, Ministry of Education & Youth Services, New Delhi, Resolution No. F 5-11/68-T. 6 dated 31st March, 1970. Copy of this Resolution is placed at Appendix I.

1.3 The following terms of reference have been given to the Committee :—

- (a) To review the present progress of the Institute of Technology in the fulfilment of its broad objective as a centre of advanced studies and research in science, engineering and technology.
- (b) To examine how far the Institute has interacted with other technical institutes with particular reference to courses of study, programmes of research and faculty development ;
- (c) To assess the overall impact of the Institute on the training of highgrade engineers for the technological development of the country;
- (d) To recommend the lines along which the Institute should be further developed for advanced studies and research, taking into account the developments that have taken place or are projected at the other Institutes of Technology and the Indian Institute of Science, Bangalore; and,
- (e) To report on any other aspect or aspects that are relevant to the overall functioning of the Institute.

CHAPTER—2

MEETINGS OF THE COMMITTEE AND SUMMARY OF RECOMMENDATIONS

2.1 The Reviewing Committee, under the Chairmanship of Dr. S. Bhagavantam, met at Indian Institute of Technology, Kanpur for about a week, commencing from 3rd August, 1970 to 7th August, 1970.

2.2 All the members of the Reviewing Committee except Rai Bahadur Gujarmal Modi were present. Due to illness, Shri Modi could not attend.

2.3 The Institute had prepared their first Decennium Report—'60—'70 and presented the same to the Reviewing Committee.

2.4 The Committee met on the fore-noon of 3.8.1970.

2.5 The Committee in consultation with Dr. M. S. Muthana, Director and Dr. E.C. Subbarao, Dean of Faculties of the Institute drew up their programme of meetings, discussions, visits etc. The Committee, according to the programme, met the following during the period 3rd August to 7th August, 1970 :—

- (a) The Faculty members of each of the ten departments, department-wise, for one hour session each—These meetings were held on 3.8.1970 and 4.8.1970.
- (b) The Visiting Professors of the Kanpur Indo-American Programme.
- (c) The elected representatives of the student community.
- (d) The Heads of Departments, Professors and senior Faculty members of Indian Institute of Technology, Kanpur.
- (e) The middle management level personnel consisting of the

Registrar, Assistant Registrar, Superintending Engineer, Stores Officer, Medical Officer etc.

- (f) The Students' Placement Committee.
- (g) The members of the Education Development Centre.
- (h) The Faculty group, representing Nuclear Science Engineering.
- (i) The Faculty of the Sanitary Engineering Department of the Civil Engineering discipline.
- (j) The Director and the Dean, Dr. Subbarao.
- (k) After finishing the above meetings upto the forenoon of 6th August, 1970, the members of the Reviewing Committee split up into groups and visited the various Faculty Departments and Central Service facilities like Library, Low Temperature Laboratory, Nuclear Science Engineering Laboratory etc.

2.6 On the 7th August, 1970, the members of the Reviewing Committee met amongst themselves and discussed the various terms of reference given to the Committee and came to certain broad recommendations/ observations.

2.7 According to term 'd' of the terms of reference, the Committee was to recommend the lines along which the Institute should be further developed for advanced studies and research, taking into account the developments that have taken place or are projected at the other Institutes of Technology and the Indian Institute of Science, Bangalore. It was felt, that a meeting of all the Chairmen and Secretaries of the Reviewing Committees of the Indian Institute of Science, Bangalore and the five Indian Institutes of Technology could be held in order to discuss the various problems and issues of common interest which are of relevance to the work of all the Reviewing Committees. Accordingly, a meeting was held at Indian Institute of Science, Bangalore on the 24th and 25th May, 1971. This meeting considered at length the various issues connected with the review of these six institutions and came to certain views and consensus in respect of those problems. The gist of the proceedings of this Bangalore meeting is given at Appendix-III.

2.8 Arising out of the above Bangalore meeting, another full dress meeting of all the Chairmen and members and Secretaries of the six Reviewing Committees was to be held later in Delhi. This meeting due to various reasons could not take place. Due to this reason and various other

reasons, the Reviewing Committee, Indian Institute of Technology, Kanpur could not meet immediately and finalise its report.

2.9 The Reviewing Committee, Indian Institute of Technology, Kanpur, subsequently met in Bangalore on the 7th & 8th February, 1973 and finalised its recommendations. Between August, 1970 and February, 1973, much water has flowed under the bridge. The Kanpur Indo-American Programme terminated in June 1972. Due to the political developments in India vis-a-vis the United States of America, there was an abrupt stoppage of the Aid Programme in June 1972 to this Institute and the expected follow-up Post Project Aid did not come through. Taking into account these factors and the proposed 5th Plan provisions indicated by the Director, the Reviewing Committee discussed certain important matters and these are detailed in Chapter No. 8.

2.10 The important recommendations/observations of the Committee are summarised below for easy reference :—

2.10.1 The Committee is satisfied that the Institute has made good progress in fulfilling its broad objectives as a Centre of Advanced Studies and Research in Science, Engineering & Technology. The inter-action between the Indian Institutes of Technology amongst themselves and the Indian Institute of Science, Bangalore, has not been upto the mark. Action should be taken to promote a positive inter-action between the Indian Institutes of Technology amongst themselves and the Indian Institute of Science, Bangalore, in a more meaningful way. There is some amount of inter-action between this Institute and other Engineering Institutions in the region. (Ref. Chapter—4)

2.10.2 The students passing out from this Institute should be motivated to take up job positions/courses in higher studies, within the country itself. (Ref. Para—5.5)

2.10.3 The Institute has trained High Grade Engineers and the products of the Institute have contributed to the development of the country both in the Public and Private Sector Industries, in R & D Organisations and in Teaching Institutions.

2.10.4 There should be a shift in emphasis from the under-graduate to the post-graduate and Doctoral Programmes and gradually the under-graduate population should be brought down to a level around 1,000 and the Post-Graduate student population be increased to reach a figure of 1,000—by the end of Fifth Five Year Plan. The Institute thus should have a total student population of around 2,000. (Ref. Para—6.2.1)

2.10.5 In order to bring out an integrated person, specialised in the field of his own choice a Hybrid Under-graduate Programme has been recommended. The student admitted to the 5-year integrated Under-graduate course, is given permissive option at the end of 3rd year to select one of the subjects in Engineering Disciplines or Pure Science subjects or Humanities or Languages for his further 2-Year Programme. The end product envisaged from this 'Hybrid course' can be an Engineer, a Scientist, a Mathematician, a Sociologist or a Specialist in Languages. He is expected to fill up appropriate responsible Executive Positions, which are readily available in the market. (Ref. Para—6.2.2)

The Committee is not in favour of starting fullfledged 5-year integrated M. Sc. courses in Physics, Chemistry and Maths. (Ref. Para—8.14)

2.10.6 *Future Research Programmes* should be Inter-disciplinary Programmes and not Departmental Programmes. (Ref. Para—6.2.3)

2.10.7 More funds should be allowed for maintenance of buildings and campus services. (Ref. Para—6.2.5)

2.10.8 It is recommended that the ultimate Faculty positions at the end of Fourth Five Year Plan be comprised of:—

(a) Professors and Associate Professors	...	100
(b) Assistant Professors	...	150
(c) Lecturers	...	100
		<hr/>
	Total	350
		<hr/>

This is to take care of 1,000 Post-graduate students and 1,000 Under-graduate students and also all the Research and Developmental activities proposed to be undertaken by the Institute. Provision may be made for supernumerary posts upto 10% of the sanctioned strength. Promotion should be on individual merit basis. The present imbalances in the staff strength in some departments should be removed by strengthening the Faculty positions wherever necessary. Keeping the broad objective of Inter-disciplinary Programmes, Joint Appointments and Appointments Across Departments, should be adopted. (Ref. Para—6.2.7)

2.10.9 The present allocation of Rs. 308 lakhs for the Fourth Five Year Plan should be redeployed and restructured in such a way that the recommendations made by the Committee are properly implemented. (Ref. Para—6.2.8)

2.10.10 New Research and Developmental activities to be undertaken by the Institute should be financed by the External User Agencies. (Ref. Para—6.2.8)

2.10.11 High priority should be given to the execution of the Students' Amenities complex. (Ref. Para—6.2.9)

2.10.12 The surplus land available with the Institute may be put to more productive use like cultivation, establishment of a peripheral industrial estate, which will utilise the R & D knowhow developed in the Institute and for locating the activities of Educational & Research Organisations which would prove to the mutual benefit of the organisation and the Indian Institute of Technology, Kanpur. (Ref. Para—6.2.13)

2.10.13 The Under-graduate Programme in Aeronautical Engineering may be suspended. The position can be reviewed when adequate support by way of men, material and resources is forthcoming to the Department from the User Agencies like Defence Ministry, Air Force, Hindustan Aeronautics Limited, Civil Aviation Department etc. (Ref. Para—6.2.14)

2.10.14 A proper Programme and Machinery may be evolved to remove the problem of "Isolation" of the students of this Institute. (Ref. Para—6.2.16)

2.10.15 A separate Training & Placement Organisation should be set up. (Ref. Para—6.2.17)

2.10.16 Now that the American Aid Programme has discontinued, the Institute should find out ways and means of developing indigenous items and spares to be used along with the American imported equipment. There should be a dynamic programme of developing spares and parts within the Institute itself or by adaptation of the equipment which is available within the country.

2.10.17 In view of the termination of the Assistance under the Kanpur Indo-American Programme by June, 1972, the Institute should find ways and means, to keep going the present and proposed activities, by standing on its own legs.

2.10.18 Funding for research activities should come from User Agencies, primarily from Public and Private Sector Undertakings, Government Departments and other organisations like Department of Atomic Energy, Department of Electronics, Indian Space Research Organisation, etc. etc. The programmed activities of the Institute should be tied to the interests of such agencies. The Science and Humanities Departments of the Insti-

tute should develop applied and technologically oriented research programmes. Pure, University type research in the Science and Humanities Departments should not be encouraged since it tends to pre-empt resources meant for technologically oriented activities. (Ref. Para—3.16.4 & 6.2.8)

2.10.19 The Institute should interact with other Engineering Colleges situated in the region in order that these Engineering Colleges develop on the right lines. (Ref. Para—4.3)

2.10.20 Staff exchange programmes amongst Indian Institutes of Technology and Indian Institute of Science, Bangalore and also with other technical institutions in the country should be worked out and this should be implemented. (Ref. Chapter—4)

2.10.21 Research Programmes should be industry oriented. (Ref. Para—3.16.4 & 6.2.3)

2.10.22 The imbalance of teaching staff in various departments should be looked into. (Ref. Para—6.2.7. F)

2.10.23 Costly and sophisticated equipment should be brought under the Central Research Facilities and Services so that all the Departments will be in a position to utilize these equipments. (Ref. Para—6.2.3. d)

2.10.24 Senior teachers should give some of their time and experience to the students.

2.10.25 Keeping the faculty strength of 350 and students' strength of 2,000 in view, and the present and projected activities of the Institute, shortages in building space should be worked out and appropriate building space should be provided to the Institute. (Ref. Para—8.7)

2.10.26 The Committee has given suitable recommendations for provision of funds for equipment under three broad headings :

- (I) Obsolescence Removal,
- (II) Consolidation,
- (III) Development Expenditure. (Ref. Para—8.8)

2.10.27 Recommendations have been made for the replacement of the existing Computer System (IBM—1620 & IBM 7044/1401) by a third Generation Computer. (Ref. Para—8.9)

2.10.28 Suitable recommendations have been made by the Committee with regard to equipping the library. (Ref. Para—8.10)

2.10.29 It is recommended that the relative expenditure on the salary bills of the Institute should be as under :—

Teaching Faculty	...	45%
Technical Supporting Staff	...	25%
Administrative Supporting Staff	...	15%
Municipal Services	...	15%

(Ref. Para—8.12)

CHAPTER—3

RECOMMENDATIONS/OBSERVATIONS OF THE COMMITTEE ON TERM OF REFERENCE (a)

3.1 The Committee placed before itself the five specific terms of reference given to them in the Government of India Resolution No. F. 5-11/68-T. 6 dated 31-3-1970 and answered the terms of reference as under :—

Term of Reference

(a) *To review the present programme of the Institute of Technology in the fulfilment of its broad objective as a centre of Advanced Studies and Research in Science, Engineering & Technology:*

3.2 With a view to ensure an adequate supply of technical personnel which would be required for post war industrial development in this country, it was felt desirable to have a Central Institution possibly on the lines of the Massachusetts Institute of Technology with a number of sub-ordinate institutions following to it or several higher institutions on regular basis or any other organisations. The Hon'ble member of Viceroy's Executive Council, Department of Education, Health and Lands of the Government of India appointed a High Power Committee under the Chairmanship of Sir N. R. Sarkar in 1946. The Sarkar Committee recommended the establishment of four Higher Technical Institutions—one for each Region in the country. In the late fifties, a fifth Higher Technological Institute was also added to this category of Institutions. Arising out of these recommendations, the Government of India, in the erstwhile Ministry of Education, established the Indian Institute of Technology at Kanpur in the year 1960. This Institute has been able to obtain assistance from the U. S. A. I. D. under the Kanpur Indo-American Programme, financed by the P. L. 480 funds.

For the period ending June, 1970, from the commencement of Aid Programme, the following assistance has been received :

(1) Dollar Aid for equipment—about Seven Million Dollars.

(2) Man-year of visiting professors, technicians and administrative staff 152

(3) Number of faculty and technicians trained under participant programme 33

3.3 As on 1-1-1971, the following physical plant and facilities have been created in the Institute :—

(a) Total instructional buildings built so far— 72,900 sq. metres.
plinth area and approximate total cost. Rs. 2,13,72,000/-

(b) Equipment procured so far

(i) Indigenous—Total cost in Rs. Rs. 1,81,99,327/-

(ii) Imported—Total equivalent cost in Rs. Rs. 3,85,50,083/-
Rs. (Actual cost in terms of £/\$/ Roubles/Marks) may also be given.

(c) Library

(i) Space 5,220 sq. metres (plinth)

(ii) No. of Titles (Books) 1,17,300.

(iii) No. of Journals subscribed—Indian 1249 : Indian— 151
& Foreign. Foreign—1098

(iv) Capital cost on Books Rs. 38,14,673/-

(v) Annual Recurring Expenditure Rs. 6,00,000/-

(d) Present Sanctioned Staff Sanctioned strength Actual as on 1-1-1971

(i) Professors 45 29

(ii) Associate Professors 35 22

(iii) Asstt. Professors 150 112

(iv) Lecturers 99 59

(v) Associate Lecturers 22 7

(e) Present total students' strength

(i) Under-Graduates 1498

(ii) Post-Graduates 658

(f) No. of Hostel seats available 2145

(g) Total expenditure incurred during : (in Rupees)

First Plan		Second Plan		Third Plan	
Capital	Recurring	Capital	Recurring	Capital	Recurring
—	—	6,49,511	3,41,885	4,82,31,430	1,71,16,637
		1966—69		1969-70 (Fourth Plan)	
	Capital	Recurring	Capital	Recurring	
	4,59,13,574	3,47,25,016	68,13,721	1,58,71,366	

(h) Brief Summary of Aid received so far from the inception of the Institute from the Foreign Collaborating Agency/Agencies, by way of :

(i) Building Cost	Rs. 7,06,15,514
(ii) Equipment	Rs. 3,26,38,529
(iii) Faculty	109 U. S. visiting faculty (Over 9 year period)

(i) Brief note on campus facilities available

(e.g., staff residence, Hospital, School, Stores, Bank, Roads, Drainage, Guest House, Vehicles, etc. etc.)

862 staff houses of all categories, 1 Campus School, a Central School.

1 Health Centre, Shopping Centre, 3 Buses, 3 Cars, One lorry.

1 State Bank, 1 Post Office.

4 Electric Sub-stations, 37 km roads, 7 sump wells and pumping stations.

30 km Sewage line.

18 km Storm water drainage.

3.4 The Institute has set before it the following broad objectives to become a centre of advanced studies and research in Sciences, Engineering & Technology :—

To develop IIT-Kanpur to make it one of the first rate Institutions of its kind by world standard.

To integrate growth and functioning of the Institute with social and industrial needs.

To develop closer association with educational institutions throughout the country to initiate changes, bring about rapid growth to achieve outstanding results.

To develop within the Campus, a sizeable intellectual reservoir

associated with research and scholarship to interact with governmental, industrial and social organizations.

To develop an Institution of excellence with a determined effort to generate and sustain the right kind of climate where sufficient number of individuals with comparable quality of mind, qualifications and competence representing several disciplines, have a reasonable opportunity of doing their best to match with the academic goals of the Institute as a whole.

3.5 The Institute was established in the year 1960 and the growth of the Institute in the first decade 1960—70 is given in Appendix IV.

3.6 The Institute has ten well established departments and a latest and well equipped Computer centre. The department-wise details are summarized below :

3.6.1 Aeronautical Engineering

In support of the undergraduate, post-graduate and research work, the following areas have been developed :

Aerodynamics, Low speed and Transonic Flight Dynamics, Design and Fabrication of a Transonic Compressor, Hypersonic Flow, Vibrations and including two-2 and 4-seater instrumented aircraft, one each, three 1-seater gliders, two-2 seater trainer gliders and various instrument facilities.

Strength of A. E. Department (Faculty, Students and Resources as on 1-1-1970)

Faculty	U. G. Population	M. Tech..Population	Ph. D. Population
14	80	17	11

Output of Graduates and Original Publications upto 1-1-1970

B. Tech.	M. Tech	Ph. D.	Original Publications
33	12	—	19

Population Projection for 1973-74

Faculty	U. G.	M. Tech	Ph. D.
20	80	20	10

Value of installed dollar equipments fully functional \$ 3,00,000

Value of indigenous equipments, original, fabricated and components. Rs. 10,00,000

3.6.2 Chemical Engineering

In support of the undergraduate, post-graduate and research programme, the department has identified the following areas for specialization :

High temperature Kinetics and Energy Transfer Processes, New Chemical Engineering Separations, Process Dynamics and Control and Design of Chemical Process Systems, Petrochemical Engineering, Chemical Engineering Kinetics and Catalysis, Reactive Gas Dynamics, Polymer Technology.

Strength of Chemical Engg. Department (Faculty, Students and Resources as on 1-1-1970)

Faculty	U. G. Population	M. Tech. Population	Ph. D. Population
17	229	35	9

Output of Graduates and Original Publications upto 1-1-1970

B. Tech.	M. Tech.	Ph. D.	Original Publications
106	26	1	34

Population Projection for 1973-74

Faculty	U. G.	M. Tech.	Ph. D.
28	250	50	25

Value of installed dollar equipments fully functional \$ 250,000

Value of indigenous equipments, original, fabricated and components Rs. 10,00,000

3.6.3 Chemistry

In developing the present programmes in undergraduate, post-graduate and research, the following areas have been taken up for specialization;

Electron microscopy, spectroscopy, digital computation, cryogenics etc. are typical examples. A strong science programme apart from providing scientific base for engineering students can develop complementary research projects when combined with advanced post-graduate instruction.

With heavy emphasis on the modern structural approach to chemistry, structure, dynamics and syntheses, the Chemistry Department is responsible for three-core courses and had developed more than thirty professional subjects. While stressing the structural approach, the department has strengthened teaching and research in theoretical chemistry, solid state chemistry, nuclear chemistry, thermo-dynamics, physical and organic chemistry. In conjunction with nuclear engineering and science centre, work on nuclear and cosmo-chemistry has been in progress. The department is a strong constituent of the Materials Science Centre both in teaching and research. Ground work has been laid in teaching and research in Life and Earth Sciences.

**Strength of Chemistry Department
(Faculty, Students and Resources as on 1-1-1970)**

Faculty	M. Sc. Population	Ph. D. Population
23	12	59

**Output of Graduates and Original Publications
upto 1-1-1970**

M. Sc.	Ph. D.	Original Publications
20	20	343

Population Projection for 1973-74

Faculty	M. Sc.	Ph. D.
28	30	60

Value of installed dollar equipments fully functional \$ 300,000

Value of indigenous equipments original, fabricated and
components Rs. 12,00,000

3.6.4 Civil Engineering

Civil Engineering department has developed the following areas in support of undergraduate, post-graduate and research programmes;

Sanitary Engineering, Soil Mechanics and Foundation Engineering, Hydraulics and Water Resources Engineering and Structural Engineering.

**Strength of Civil Engineering Department
(Faculty, Students and Resources as on 1-1-'70)**

Faculty	U. G. Population	M. Tech. Population	Ph. D. Population
28	135	60	21

**Output of Graduates and Original Publications
upto 1-1-1970**

B. Tech.	M. Tech.	Ph. D	Original Publications
67	51	3	124

Population Projection for 1973-74

Faculty	U. G.	M. Tech.	Ph. D.
30	150	60	25

Value of installed dollar equipments fully functional \$ 400,000

Value of indigenous equipments, original, fabricated and components Rs. 10,00,000

3.6.5 Electrical Engineering

In support of the undergraduate, post-graduate and research work, the following special areas have been identified and developed :

(i) Communication System, (ii) Computer Sciences, (iii) Control Systems, (iv) Electronic Devices and Circuits, (v) Power Systems and (vi) Systems Theory.

Some of the large research and development projects in the department are planned for (a) development of compatible set of digital ICs, (b) Input/Output devices for computers (c) TV receivers and systems development using solid state devices (d) Tropo-Scatter Communication Project, (e) Image Processing, (f) Software development for Power system problems. Substantial fabrication facility is planned.

**Strength of Elect. Engg. Department
(Faculty, Students and Resources as on 1-1-1970)**

Faculty	U. G. Population	M. Tech. Population	Ph. D. Population
34	323	69	24

**Output of Graduates and Original Publications
upto 1-1-1970**

B. Tech.	M. Tech.	Ph. D.	Original Publications
137	62	3	75

Population Projection for 1973-74

Faculty	U. G.	M. Tech.	Ph. D.
40	300	80	30

Value of installed dollar equipments, fully functional \$ 700,000

Value of indigenous equipments, original, fabricated and components Rs. 15,00,000

3.6.6 Humanities and Social Sciences

Humanities and Social Sciences play a significant role in the overall education of engineers and scientists. This department has developed the following five major areas :

English, Philosophy, Sociology, Psychology and Economics. The five year integrated under-graduate Engineering Programme provides for 15% in its total curriculum for humanities and social sciences. Post-graduate, instruction and advanced work have been developed in Philosophy, Sociology and Economics.

**Strength of Humanities and Social Sciences Department
(Faculty, Students and Resources as on 1-1-'70)**

Faculty	M. A. Population	Ph. D. Population
21	—	13

Output of Graduates and Original Publications as on 1-1-1970

Ph. D.	Original Publications
3	102

Population Projection for 1973-74

Faculty	M. A.	Ph. D.
30	—	20

Value of installed dollar equipments, fully functional	\$	200,000.
Value of Indigenous equipments original, fabricated and components	Rs.	10,00,000.

3.6.7 Mathematics :

The Institute has endeavoured to take steps to bring a viable group in pure and applied mathematics. Apart from catering to the undergraduate programmes in Engineering and Sciences, a sizeable Doctoral Programme has been developed. The department is concentrating in areas like modern analysis, modern algebra, topology, numerical analysis and modern statistics.

Strength of Mathematics Department (Faculty, Students and Resources as on 1-1-1970)

Faculty	M. Sc. Population	Ph. D. Population
22	10	36

Output of Graduates and Original Publication as on 1-1-1970

M. Sc.	Ph. D.	Original Publications
14	30	483

Population Projection for 1973-74

Faculty	M. Sc.	Ph. D.
30	10	45

Value of installed dollar equipments fully functional	\$	10,000.
Value of indigenous equipments, original, fabricated and components	Rs.	1,00,000.

3.6.8 Mechanical Engineering

In support of the under-graduate, post-graduate and research work, the following areas have been developed; Solid Mechanics, Vibrations, Heat Transfer, Fluid Mechanics, Control and Applied Kinetics, Prototype equipment development etc.

The following areas are contemplated for research and development;

Mechanical systems design, Thermal environmental engineering, Fluidics, Instrumentation and Control, Industrial and Production engineering and entrepreneurial development and nuclear science and engineering.

**Strength of Mechanical Engineering Department
(Faculty, Students and Resources as on 1-1-1970)**

Faculty	B. Tech. Population	M. Tech. Population	Ph. D. Population
26	304	72	13

Output of Graduates and Original Publications upto 1-1-1970

B. Tech.	M. Tech.	Ph. D.	Original Publications
157	52	3	50

Population Projection for 1973-74

Faculty	B. Tech.	M. Tech.	Ph. D.
40	175	70	25

Value of installed dollar equipments fully functional \$ 400,000

Value of indigenous equipments, original, fabricated and components. Rs. 30,00,000

3.6.9 Metallurgical Engineering

Metallurgical Engineering Department in support of the under-graduate, post-graduate and research has identified three basic areas: Process Metallurgy, Physical Metallurgy and Ceramics. Process Metallurgy area incorporates mineral engineering, ferrous extractive metallurgy and non-ferrous extractive metallurgy. Physical metallurgy covers thermo-dynamics, electro-chemistry and corrosion, phase transformations, mechanical and engineering metallurgy. Ceramics area covers process ceramics, physical ceramics and glass technology.

**Strength of Metallurgical Engineering Department
(Faculty, Students and Resources as on 1-1-1970)**

Faculty	B. Tech. Population	M. Tech. Population	Ph. D. Population
18	169	27	11

Output of Graduates and Original Publications upto 1-1-1970

B. Tech.	M. Tech.	Ph. D.	Original Publications
96	30	1	73

Population Projection for 1973-74

Faculty	B. Tech.	M. Tech.	Ph. D.
28	175	40	25
Value of installed dollar equipments fully functional			\$ 300,000.
Value of indigenous equipments, original, fabricated and Components			Rs. 15,00,000

3.6.10 Physics

In support of the undergraduate, post-graduate and research programme, the department has identified and worked in the following areas;

Solid State Physics (Crystal Structure, Defects in Crystals in simple inorganic systems, inorganic and organic semi-conductors, Cryogenics and Solid State), study of Neutron irradiated crystals by ESR techniques, Mass Bauer Work, Proton capture studies, and optics.

**Strength of Physics Department
(Faculty, Students and Resources as on 1-1-1970)**

Faculty	M. Sc. Population	Ph. D. Population
35	36	61

Output of Graduates and Original Publications upto 1-1-1970

M. Sc.	Ph. D.	Original Publications
35	41	136

Population Projection for 1973-74

Faculty	M. Sc.	Ph. D.	
35	30	60	
Value of installed dollar equipments fully functional			\$ 550,000
Value of indigenous equipments, original, fabricated and components			Rs. 15,00,000

3.6.11 Computer Centre

The Institute has a modern Computer Centre. It has the following systems :—

Hardware : IBM 1620

Software : SPS, Forgo IV,
Fortran II

Hardware : IBM 7044/1401 A complete set of IBM 1620 Library programmes (more than 300 programmes).

Software : IBSYS Version 9 model 9
 WATFOR[FORTRAN (V)]
 LINEAR Programming II
 GPSS III
 PERT
 ALGOL, SNOBOL, SIMSCRIPT, SLIP, DYNAMO, PAC-TOLUS, MODIFIED NUCROS Program, An extensive library of SHARE PROGRAMS.

IBM 1800 : PDP-1, a recent gift acquisition from Stanford University, is being installed.

3.6.12 Interdisciplinary Programmes

A number of interdepartmental activities have been developing over the years arising out of the natural interests of faculty. Some of these have emerged as effective centres with appropriate rate of growth to keep faculty enthusiasm and output at their optimum. Computer centre, Materials Science centre and Nuclear Engineering and Science centre are three such activities. The academic climate within the Institute so far has been appropriate for developing such interdisciplinary and interdepartmental activities. Two more interdisciplinary and important programmes are planned during the initial phase of the V 5-year plan: (i) Design and Development Centre for Engineering Systems (ii) Industrial Engineering, Production Technology and Industrial Management Centre.

Population Projection of Unassigned Numbers in Interdisciplinary, Special Areas and Programmes

Faculty	Ph. D.
42	55

3.7 Faculty Position

The following chart gives the progressive build-up of the faculty position through the years 1960—72.

Faculty Position from 1960 upto Date (Yearwise)

Year	Professor	Assoc. Prof.	Asstt. Prof.	Lecturer	Sub-total Col. 2 to 5	Assoc. Lecturer	Total Col. 6 & 7
1	2	3	4	5	6	7	8
1960	—	—	3	11	14	1	15
1961	—	—	5	21	26	1	27
1962	—	—	12	33	45	1	46
1963	3	8	25	38	74	3	77
1964	7	8	36	45	96	3	99
1965	15	6	53	55	129	11	140
1966	17	9	72	53	151	15	166
1967	18	17	82	75	192	12	204
1968	23	15	98	71	207	10	217
1969	28	18	104	69	219	9	228
1970	29	24	114	57	224	7	231
1971	26	33	123	63	245	5	250
1972	28	43	129	66	266	5	271

3.8 The following table will show the progressive students' growth of M. Tech., Ph. D. in Sciences and Humanities and Social Sciences and Ph. D. in Engineering.

Year	M. Tech.	Ph. D. (Sciences and HSS)	Ph. D. (Engineering)	Total
1960-61	—	2	—	2
1961-62	—	10	1	11
1962-63	—	23	1	24
1963-64	—	20	1	21
1964-65	27	103	10	140
1965-66	81	134	14	229
1966-67	175	160	32	367
1967-68	274	165	59	498
1968-69	264	169	72	505
1969-70	316	174	92	582
1970-71	294	163	107	564
1971-72	318	169	140	627
1972-73	390	195	165	750
1973-74	390 (proposed)			

It is understood that applications equivalent to ten times the number of seats of post-graduates are received. The post-graduate admissions are made on semester basis twice in a year. The admissions to the post-graduate courses are made on the basis of the qualifying examination marks, a written test and interview. This system of screening the applicants has ensured high quality of students in the post-graduate programmes.

3.9 The Institute has actively undertaken research programmes in different departments. Some of the major areas of research and specialisation have already been mentioned in the departmental data given in para 3.6. However those areas of specialisation, research and development may be restated for the purpose of reference at a single point. The areas are alphabetically arranged as under :—

Algebra, analysis and topology; applied kinetics; Chemical engineering analysis; circuit and system theory; communication and information system; computer science; control systems; electronic circuits and devices; energy transfer; environmental sanitation; geotechnical sciences; humanities and social sciences; inorganic and analytical chemistry; magnetic resonance; mass transfer; mechanics of fluids; mechanics of solids; molecular spectroscopy and molecular structure; nuclear engineering; nuclear and high energy physics; nuclear and isotope chemistry; operations research and ballistics; organic chemistry; physical ceramics; physical and mechanical metallurgy; probability; statistics and information theory, process dynamics; process metallurgy; soil mechanics; solid state chemistry; solid state physics; structural mechanics; theoretical chemistry etc.

3.10 Research Publications and Text Books

The Institute has to its credit about 2000 research publications. The faculty have written about 40 text books on various subjects which have been received well in the country and abroad. Large number of teaching and lectures, notes and reports have been published by national and international, book publishing agencies.

3.11 Design and Development Work

Collaboration of substantial magnitude between IIT-Kanpur and industrial and other organizations has been developed during the last few years. About a hundred sponsored projects are being worked out in the laboratories of the Institute. Over 132 typical special equipments and prototypes have been fabricated during the last few years in the laboratories and workshops of the Institute.

3.12 Conferences, Seminars, Summer Institutes and Intensive Courses

Very large number of such meetings and programmes have been taking place in the Institute, averaging between 35 and 40 a year, involving a sizeable number of participants from a cross-section of industries, educational institutions and other organizations in India and abroad. The courses and conferences enabled the faculty to develop close contacts with their counterparts in other educational institutions and with engineers from industry and government agencies.

The Institute is conducting a large number of Summer School Programmes, Winter School and Sequential Summer School Programmes. Large number of teachers have been trained in the Institute under the Technical Teachers' Training Programme sponsored by the Ministry of Education. The Institute is also training a large number of in-service teachers for M. Tech. and Ph. D. programmes, under the Quality Improvement Programme sponsored by the Ministry of Education and Social Welfare. The Institute is also arranging intensive courses and workshops on subjects of special interest which are attended by faculty of other technical institutions and personnel drawn from industry.

3.13 Assistance through the Collaboration Programme

Apart from providing the building and equipment facilities, the KIAP has provided the Institute assistance in the form of visiting Professors and experts from abroad to the Institute and by training Indian faculty and staff at universities and organisations in the U. S. A.

Details of the experts/visiting professors who have served the Institute and the details of the Indian Staff trained in the U. S. A. are given in Appendix V.

3.14. Under the Aid programme, the Institute has received equipment worth Rs. 3,85,50,083. A detailed list of equipment procured under the Aid Programme, costing, more than \$ 5000 apiece is given in Appendix VI.

3.15 Operating Budget of the Institute

The details of the recurring non-plan expenditure of the Institute for the years 1969-70, 1970-71 and projected for the years 1971-72, 1972-73 and 1973-74 are given in Appendix VII. From this it would be observed that net recurring expenditure of the institute for the year 1969-70 is about Rs. 139 lakhs and for the year 1970-71 Rs. 151 lakhs. Of these amounts about Rs. 83 lakhs and Rs. 89 lakhs represent the pay and allowances of the staff. The projected figure for 1973-74 provides for a salary bill of Rs. 116 lakhs and other recurring expenditure expenditure of about

Rs. 98 lakhs, totalling a gross recurring (non-plan) expenditure of Rs. 214 lakhs.

3.16 Comments of the Reviewing Committee

3.16.1 Looking to the performance of the Institute against the broad objectives and set up, as a centre of advanced studies and research in Sciences, Engineering and Tech., the committee would like to record their appreciation regarding the commendable progress and growth achieved by the Institute in the last ten years. The Institute has been able to establish a very well structured 5 years integrated programme in the undergraduate courses. The significant feature of the undergraduate engineering programme is the excellent and well thought out undergraduate core programme which includes courses in basic and applied sciences, Mathematics, Graphic Arts, Elementary Engg. principles, Workshops, Humanities and Social Sciences. The details of the Post-graduate, Ph. D. and Post doctoral programmes have been given in the preceding paragraphs. From an appreciation of the above, the Committee finds that the Institute has been able to develop professionally high calibre research on reasonable magnitude.

3.16.2 Notwithstanding the above comments, the Committee has to point out that the growth of the Institute, on the whole has not been planned in perspective. Departments of the Institute have been grown disjointedly. Research Programmes and equipment acquisition have been based on individual interests of the staff members, as they were recruited. During the early stages of development of the Institute there was emphasis on Basic Sciences, Humanities and Social Sciences, conventional engineering and the best men available in these faculties were taken in. Proper attention could not be paid to certain departments. This has resulted in the earlier stabilized departments (specially some of the Science departments) tending to accumulate more resources. This has also resulted in duplication of equipment and courses.

3.16.3 The Committee recommends that the imbalance in the growth of the various departments should be corrected. Special attention should be paid to underdeveloped departments, and the future allocation of resources should be made on a planned basis so that each department becomes a viable unit. It is also recommended that the future research programmes of the Institute should be largely interdisciplinary and interdepartmental. For the same reasons, future faculty appointments should also be interdepartmental to a large extent. The committee is shortly going to discuss about the quantum of faculty strength for the Institute by way of Professors, Associate Professors, Assistant Professors and Lecturers and technical staff. It is felt that in order to successfully carry

out the teaching and research, programmes of the Institute, the appointment of faculty should be so regulated that the total number of members in each level being fixed, the programme will be so arranged that the persons designated under a particular department should take up courses and work load in other departments also. The recruitment policy of the Institute should give this kind of flexibility.

3.16.4 The Committee would like to comment upon another aspect of the research programmes, namely, the research funding arrangement of the Institute. The Committee is of the view that the Research funding should primarily come from the User Agencies like the Public and the Private Sector Industries, Government Departments and organisations like C. S. I. R. Department of Atomic Energy, Department of Electronics, Department of Space Research, R & D Organisations of Defence Ministry etc. etc. Programmed activities of research should be tied up to the interests of such Agencies. Science, Humanities and Social Sciences Departments of the Institute should grow applied and technologically-oriented research programmes-pure, university type research programmes in the Science and Humanities Departments should be discouraged since it tends to pre-empt resources meant for technologically-oriented activities.

CHAPTER—4

RECOMMENDATIONS/OBSERVATIONS OF THE COMMITTEE ON TERM OF REFERENCE (b)

Here the Committee is going to discuss term 'b' of reference namely :

(b) To examine how far the Institute has interacted with other technical institutes with particular reference to courses of study, programmes of research and faculty development:

4.1 The Committee tried its best to give their correct opinion on this term of reference by discussing this issue with the Director, Dean of Faculties, Senior Faculty Members of the various Departments, etc. The observations of the Committee on this particular term of reference are both positive and negative. There is a Co-ordinating Agency called the "Council of the Indian Institutes of Technology" which mainly lays down the administrative policy decisions and deals with certain academic matters like the Common Entrance Test, etc. etc. But with regard to the inter-action amongst the Indian Institutes of Technology, in the matter of academic courses, the Committee found that the position was not very satisfactory. The Committee understood that every year there is an Inter-IIT sports meet. This gives a limited forum for a limited number of sportsman students of the various Indian Institutes of Technology to meet together and exchange ideas and opinion. But for this Inter Indian Institutes of Technology's annual sports meet, there is no organised machinery for inter-action between the students of the various Indian Institutes of Technology.

4.2 Common problems and issues faced by each Indian Institute of Technology are discussed in the forum—the Council of the Indian Institutes of Technology. The Council lays down broad policy matters and guidelines for the Institutes to follow. In this way, there is inter-action between the various Indian Institutes of Technology.

4.3 The Committee took into consideration the aspects of the Faculty, Academic Courses, Students Community, Research Programmes of the

Indian Institute of Technology, Kanpur and their inter-action with Regional Engineering Colleges and other Engineering Institutions in the country. While examining this aspect, the Committee observed as under :—

4.3.1 The Computer facility at Indian Institute of Technology, Kanpur, has been extensively utilised by the Faculty and Staff of the Engineering Institutions in the region.

4.3.2 The Senior Faculty Members of the Indian Institute of Technology, Kanpur, go and deliver lectures in other institutions in the region.

4.3.3 The Faculty Members of the other institutions in the region are also invited to give lectures and participate in Seminars etc. at the Indian Institute of Technology, Kanpur.

4.3.4 When the Engineering courses in Civil, Mechanical, Electrical Disciplines were started in 1964, at the Harcourt Butler Technological Institute at Kanpur, some senior Faculty Members of the Indian Institute of Technology, Kanpur, developed these courses by acting as Guest Professors in the above mentioned institution.

4.3.5 The Indian Institute of Technology, Kanpur, has been conducting quite a number of Advanced Summer Schools, Sequential Summer School Programmes and Winter Schools for the benefit of faculty of other Engineering Institutions in the country.

4.3.6 Under the Teacher Training Programme sponsored by the Ministry of Education, the Indian Institute of Technology, Kanpur, is conducting a special One-year Master's Programme in Technology for those who have successfully passed out the Sequential Summer School Programme.

4.3.7 Under the recent Quality Improvement Programmes launched by the Ministry of Education and Social Welfare, Indian Institute of Technology, Kanpur, are proposing to recruit 12 serving Teachers for the Master's Programme and also 6 serving Teachers for the Ph.D. Programmes.

4.3.8 A good number of Faculty Members of Indian Institute of Technology, Kanpur, have written a number of text books and have developed a number of teaching aids, laboratory manuals etc.

4.3.9 The Indian Institute of Technology, Kanpur, has developed the know-how for the manufacture of Prototype equipment used in laboratory/workshop of Engineering Institutions.

4.3.10 These are some of the more important activities highlighted here. In many other way, the Indian Institute of Technology, Kanpur, is trying to establish relations with other Engineering Institutions in the region.

The Committee while taking note of what has been done in this direction, would like that these inter-relation activities and exchange programmes continue and grow.

4.4 However, the Committee is sorry to note, that practically there is no interaction between the Indian Institute of Technology, Kanpur and the Indian Institute of Science, Bangalore. So is the case of interaction with other important Research and Development Organisations like C.S.I.R., Tata Institute of Fundamental Research, Atomic Energy Establishment, R and D Organisations of Ministry of Defence, etc. Of course, the Committee was informed that organisations like C.S.I.R., Atomic Energy Establishment, Oil and Natural Gas Commission, etc. etc. have given some sponsored Research Programmes—but the interaction and the inter-relationship is confined only to these specific sponsored projects given to the Institute. The Committee would wish that better interaction between this Institute and other important R and D Organisations is developed.

4.5 Suitable machinery must be built-up to permit exchange of staff amongst the Indian Institutes of Technology, themselves, and with other institutions and R and D Organisations for one or two Semesters at a time. The staff member would retain his rank and continue to draw his salary and allowances from his parent organisation.

4.6 In mutual consultation amongst the Indian Institutes of Technology and other Engineering Institutions, ways and means should be explored to allow postgraduate (and where feasible, even undergraduate students) to use the facilities and/or register under the staff of other Institutes of Technology. In this manner, both the staff and the facilities would be more optimally utilized. This would also permit diffusion of culture between various campuses.

4.7 Apart from exchange of staff amongst the Indian Institutes of Technology and other Institutions, teachers and students of Indian Institute of Technology, Kanpur should be able to utilize the facilities available at organisations like C.S.I.R., Tata Institute of Fundamental Research, Department of Atomic Energy, R and D Organisations of Defence, etc., etc. Ways and means should be explored to bring about the above. Similarly, the staff of these organisations should be drawn to the Indian Institute of Technology, Kanpur, for stipulated periods. If these Exchange Programmes are properly worked out on a 'two way traffic' basis, real interaction between the Indian Institutes of Technology and other technical institutions on the one side and the other important R and D Organisations on the other side would be developed and bring about the much desired interaction between teaching, research, industry and user agencies.

4.8 There is often a criticism about the "ivory tower attitude" of the

Higher Institutes of Technology vis-a-vis the ordinary Engineering Colleges and University departments. On critical examination of the various activities undertaken by this Institute, the Committee is satisfied that this criticism is not quite justified. Interaction means a two way traffic where the receiver and the giver have both to act in co-operation and co-ordination. The Committee is sorry to note that the biggest handicap is due to the restrictive rules and regulations of the other institutions or their Governments with regard to the recruitment, service conditions conditions of deputation, transfer, study leave, etc. There can be no doubt that once, such restrictions are removed or suitably modified, these institutions would be the real beneficiaries. The Committee would recommend that the authorities concerned be prevailed upon to look at all the aspects of this problem and evolve suitable machinery and liberal procedures in such a way that there is a freer interchange of teaching faculty between this Institute and other institutions/organisations, on a 'two way traffic' basis.

CHAPTER—5

RECOMMENDATIONS/OBSERVATIONS OF THE COMMITTEE ON TERM OF REFERENCE (C)

Here the Committee is going to discuss term 'c' of reference namely :

(c) To assess the overall impact of the Institute on the training of highgrade engineers for the technological development of the country:

5.1 The Committee noted that the first batch of B.Tech. Graduates in Engineering subjects passed out from the Institute in 1966. The Committee critically analysed the placement figure given by the Chairman of the Placement Committee of the Institute. The Committee also had discussions with the Chairman and Members of the Placement Committee.

5.2 There is a general criticism against all the Indian Institutes of Technology and particularly against the Indian Institute of Technology, Kanpur that the products of the Institute, whose cost of training is much higher than other engineering institutions, tend to go abroad for pursuing higher studies and for seeking employment. Facts and figures will give the correct answer to this criticism. Accordingly, on the request of the Committee, the Placement Committee of the Institute has given a detailed statement which is at Appendix IX.

On a critical examination of the above statement, we can arrive at the following analysis :—

Level of Graduation	No. of graduates between years 1965-72	No. employed in India	No. pursuing higher studies in India	No. pursuing higher studies or in employment abroad	%of persons gone abroad against the out-turn of the Instt. shown under Co. 2	Status not known
1	2	3	4	5	6	7
B. Tech.	1324	713	169	344	25%	98
M. Tech.	587	372	48	118	20%	49
Ph. D. (Engg.)	42	36	—	4	10%	2
M. Sc. (Science)	177	117	19	31	18%	10
Ph. D. (Science)	156	120	—	30	20%	6

5.3 From the above it would be observed that in the B.Tech. and M.Tech. levels, the migration abroad is 25% and 20% respectively and in the M.Sc. (Science) and Ph.D. (Science) level, the migration is about 20%. One gratifying feature of the situation is, that, of late, the trend of the products of the Indian Institute of Technology, Kanpur, to go abroad, has been coming down. There is a positive improvement in the situation. But it does not mean that we can retain the cream of the products coming out from the Institute. The very best are still going abroad. The only way to retain them in the country and make them available for work for our various national projects, is to offer better jobs and emoluments by organisations like the Bureau of Public Enterprises, Government departments, on the analogy of terms and emoluments offered by the private sector. The Committee understood that various private sector industries send their recruitment teams to Indian Institute of Technology, Kanpur, to interview and screen the final year students, with a view to offer them employment. The terms offered by the private sector industries are better than those offered by the Government Departments and Public Sector Undertakings. All the products of the Indian Institute of Technology, Kanpur, cannot be absorbed by the private sector only—this is also not desirable. Therefore, in order to attract and retain the good products turned out by the Institute, enlightened recruitment policies should be initiated by organisations like the Bureau of Public Sector Enterprises, Government Departments, Government Industrial Undertakings, etc., etc. The Committee would like to emphasize that in order that the best talent coming out from the Institute is available for the National Development work of the country, the employing agencies in the country should suitably motivate the students and give them suitable job positions.

5.4 Attempts should be made to encourage self-employment. An Industrial Estate has been opened around the campus and this mainly functions in the field of Electronics. It was observed that about 20 students have set up production units of their own, and of these only 3 or 4 students have business background. The Institute has also organised some course of entrepreneurship so that more and more products of the institute should take up self-employment by utilising the facilities offered by the Government and the technical know-how that could be supplied by the Institute. The Training and Placement Department should take care of this work also.

5.5 On the whole, the Committee was happy about the availability of products of the Indian Institute of Technology, Kanpur, for developmental work within the country. It is apparent that quite a few students are attracted by the facilities available abroad and thus go away from the country, first to prosecute higher studies and subsequently to take up job

positions in foreign countries. This situation is not conducive, specially when the per-capita cost of training of the Under-Graduates and Post-Graduates of this Institute is particularly high in comparison to the cost of training at other Institutions in the country. In the circumstances, the Committee would strongly urge that both the Institute and the Employing Agencies should motivate the students of this Institute in such a way as to encourage them to stay in the country, whether it is for prosecuting higher studies or for taking up job positions. Although the Committee would not like to go into the question of merits and demerits of the problem of "Brain Drain", the Committee would like to emphasize that the products of this Institute, after having been trained at a particularly high per-capita cost, should be available for the needs of the country. The Institute and the Employing Agencies should give necessary motivation and incentives to the students of this Institute so that they are assured of their job security and status and devote themselves in the developmental work of the country.

CHAPTER—6

RECOMMENDATIONS/OBSERVATIONS OF THE COMMITTEE ON TERM OF REFERENCE (d)

Here the Committee is going to discuss the term of reference 'd' viz. :—

To recommend the lines along which the Institute should be further developed for advanced studies and research, taking into account the developments that have taken place or are projected at the other Institutes of Technology and the Indian Institute of Science, Bangalore.

6.1 It was observed by the Committee that in order to know the developments that have taken place or are projected at the other Institutes of Technology and the Indian Institute of Science, Bangalore, there should be a Joint Meeting of Chairmen and Secretaries of the Reviewing Committees of the five Indian Institutes of Technology and Indian Institute of Science, Bangalore. This meeting of the Chairmen and Secretaries of the six Reviewing Committees took place at the Indian Institute of Science Bangalore on the 24th and 25th May, 1971. As already reported under 2.7, this meeting considered at length the various issues connected with the review of these six Institutions and came to certain views and consensus in respect of these problems. The gist of the proceedings of this Bangalore meeting is given at Appendix III.

6.2 The Committee would like to give the following observations/recommendations with regard to this term of reference. For the sake of convenience, the recommendations/observations are given under various sub-headings as below :

6.2.1 Future growth of the Institute

The Committee desired to find out from the Director, the Dean of Faculties, Faculty Members and from their group discussions with the various authorities of the Institute as to what should be the ultimate

strength of student-population in this Institute. Arising out of these discussions, the general consensus was in favour of keeping a student population of 2000 in the campus. The Committee observed that this figure of 2000 students would be a reasonable figure for a period of say another 5 to 10 years or so. The total student population should be kept at a figure of 2000 which would facilitate consolidation of the present activities of the Institute. The Committee observed that at the time of their visit in August, 1970, the Institute had an approximate Under-graduate students' strength of 1300 and a Post-graduate students' strength of 700, thus making a total of about 2000 students in all in the campus. The Committee seriously discussed with the various Cross Sections of the Institute, regarding the ratio of the Post-graduate students' strength to that of the Under-graduate students. The existing ratio of Post-graduate students and Under-graduate students is in the proportion of 1 : 2. This being a higher Institute of Technology, the Committee felt that there should be a shift in emphasis on the training of Post-graduates and Ph.D. students, rather than emphasizing on the Under-graduate courses. No doubt, in order to have a good base in the Institute, certain amount of Under-graduate activity is essential, but the emphasis should always be on the side of training of good M.Sc.s., M.Techs. and Ph.D.s. In order to achieve this objective, the Committee recommended that it would be advisable to gradually reduce the Under-graduate strength and increase the Post-graduate students' strength in such a way, that in the course of next 5 years or so, we reach a ratio of 1 : 1—i.e., the Committee envisages that by the end of 1975, the Institute would be having a total Post-graduate student population of 1000 and Under-graduate population of 1000 students, totalling 2000 students.

6.2.2 Future Academic Course Programmes

(f) There was considerable discussion on this point which the Committee had with the Cross Sections of Authorities, students and faculty members of the Institute. There was a strong plea from the Science and Humanity faculties for starting straight-jacketed Under-graduate Programmes like B. Sc. in Pure Sciences, Bachelor of Arts in Humanities etc. There was equally a strong argument, mostly from the Engineering Faculty, that these Under-graduate programmes in Pure Sciences and Humanities should not be started.

(i) The Committee realised that the Institute aims at producing an integrated person, particularly an Under-graduate Engineer or Technologist with enough grounding in Pure Sciences, Mathematics, Humanities, Languages, etc. If this is to be so, it is essential that the Institute has got strong departments in Science, Mathematics, Humanities, Languages, etc. In order to have a strong department, it is necessary to have good faculty. The department can attract good faculty only if the department

is able to offer challenges and enough of teaching, research and guide work to the Faculty Members. The Committee was aware of the difficulties of finding and recruiting good Faculty in Pure Science, Mathematics, Languages and Humanities in Technological Institutions of this kind. Viewed from this angle, the Committee was interested in finding out a suitable academic programme for the Institute which could fulfil the above requirements. With this purpose in view, the Committee had detailed and interesting discussions with the Cross Sections of the Institute.

(iii) Apart from the above, Dr. Jagdish Lal, one of the members of the Committee, conducted a sample survey to find out the reactions of the student community to the new academic courses which might be started at the Institute. He conducted an opinion survey amongst the 4th year Mechanical Engineering students.

(iv) The results of the survey were revealing. It was observed from this survey and also from the general consensus of the Cross Sections of the Institute that it would be necessary to start a "Hybrid Course" which will have the same base, upto the 3rd Year level, in common with the present 3rd Year level of the five year integrated Engineering courses and at the end of the 3rd Year, restricted permission may be allowed to some students to opt out, for courses, either in Pure Sciences, Mathematics or in Humanities—that is to say, students would be admitted to the five year integrated course of the Institute, as we are doing now. The Institute would intimate the students even before their admission to the Institute, that permissive option would be given to them at the end of their 3rd Year level, to opt out for the particular discipline—Civil, Electrical, Mechanical, etc. on the Engineering side or they can opt out to study in Pure Sciences or Humanities in the 4th and 5th Year. If necessary, a certain amount of orientation can be introduced in the 2nd Semester of the 3rd Year, depending upon the students' option to the Engineering or the Science or the Humanities streams.

(v) The respective academic bodies of the Institute can further work out the details and decide upon an exact nomenclature to be given to the Science and Humanities students who have opted for these subjects at the end of their 3rd Year. Perhaps one can think of B. Sc. in Engineering Mathematics, B.A. in Engineering Economics, B.Sc. in Engineering Physics, and B.A. in Engineering Sociology. etc.

(vi) The genesis for the birth of the "Hybrid" course arose from the fact that the students are so young and immature at their Higher Secondary level that they are not able to decide their career subjects for themselves. Mostly it is the parents' choice. The parents decide that their son or daughter should become an Electronics Engineer and accordingly action is taken for getting them admitted to the particular course. The students

themselves, thus, have not much say in the matter nor also they would be able to decide for themselves at that age. At the end of the 3rd Year level, the students become more mature and are able to fix up their attitude, likings and dislikings, and at that level they are able to discriminate and decide for themselves as to whether they would be more successful as Engineers, Scientists and Economists or Sociologists. The first three years would give adequate grounding in Graphic Arts, Science, Humanities, Languages, Mathematics and also in certain basic elementary Engineering Subjects to the students.

(vii) In the present economic conditions of the country, there is a need for this kind of Hybrid products as envisaged above. With the growth of both Public Sector and Private Sector industries, such graduates will be in great demand in the Indian economy and administration. Many things are demanded from an executive in industry. If he is to be successful, he has to be an alrounder having backgrounds of Engineering, Science, Economics, Sociology, Costing, Management, etc. etc. It is anticipated, that by properly framing out a curriculum, the products of these Hybrid courses would become Physicists and Chemists and Economists with a foundation in Mathematics, Systems Sciences, Computer Methodology etc. Similarly, one can anticipate an economist or sociologist having a good Science and Engineering background. In our changing spectrum of employment of middle level executives, Managers and Chief Executives, requirement of this kind of personnel is increasing day by day.

(viii) In view of the foregoing, the Committee would recommend that the Indian Institute of Technology, Kanpur, could start a new Hybrid course as mentioned above. However, in keeping with the basic objectives of the Indian Institute of Technology, Kanpur, it would not be advisable to allow more than 10% of the students, to exercise this kind of permissive option to switch over to Science and Humanities stream from the pool admissions made to the 5-year integrated under-graduate courses in Engineering.

6.2.3 Future Research Programmes

(i) The Committee noted that except in a few cases, the Research Programmes undertaken by the Institute, so far, have been on departmental basis. This leads to duplication of facilities in men, material and avoidable wastage of resources. Therefore, the Committee recommended that all future Research Programmes should be evolved on an interdisciplinary and inter-departmental basis. These Research Programmes should be discussed and co-ordinated in the appropriate academic bodies/ councils of the Institute.

(ii) The following Inter-disciplinary Programmes are suggested :—

- (a) Nuclear Science Engineering;
- (b) Material Science;
- (c) Computer Science Programme;
- (d) Ground Water Resources Investigation including Geo-Physics;
- (e) Environmental Engineering (dealing with the problems of Air Pollution, Water Pollution, Sanitary Engineering, Waste Disposal, Ecological Balance etc).

(iii) In order to successfully conduct these kinds of Inter-disciplinary Programmes, the Committee recommends the following :—

- (a) Wherever necessary, strengthening of the Faculty should be undertaken by the Institute;
- (b) There should be a positive approach for making joint appointments and appointments across the departments—or in other words future recruitment of Faculty should not be according to the old pattern of departmental appointments. To illustrate the point, a Mathematics Faculty Member can be recruited for Inter-disciplinary Programme of Computer Science and a Physicist for the Nuclear Science Engineering Programmes. This is what the Committee means by Joint appointments or appointments across the Departments;
- (c) There should be a planned growth of Inter-disciplinary Programmes;
- (d) The men, material and space available in the Institute should be put to the optimum use. This can be done by pooling all the resources of the Institute. To sum up, both the planning and budgeting, should be done on a "Programme" basis rather than on "Departmental" basis;
- (e) Research funding should primarily come from the User Agencies;
- (f) All the sponsored projects should be with the Institute, in the first instance. The Institute should allocate the projects to the co-ordinators in the various departments and resources would be allocated by the Institute, through the co-ordinators, instead of through the Heads of departments;

- (g) Topics and areas of Research should be chosen which are of relevance to the problems in the country;
- (h) Being an Institute of Technology, more industry oriented and applied Research problems should be taken rather than problems of pure theoretical nature.

6.2.4 Maintenance Aspects

Under the Aid Programme, the Institute has received equipment worth about seven million dollars. With the termination of the Aid Programme, it is necessary for the Institute to develop the spares and parts indigenously, to locate indigenous supply sources or alternative sources and put through a dynamic programme of adapting and adopting the costly equipment, in such a way that these are put to optimum use.

6.2.5 Maintenance of Building and Campus Services in the Institute

(i) The Committee had detailed discussions on this subject with the Superintending Engineer of the Institute and other concerned authorities. The Committee observed that the allotment of funds for the maintenance of the buildings of the Institute and other essential services like electricity, water supply, roads, drainage, etc., is very meagre (at present this is about Rs. 10 to 12 lakhs per annum).

(ii) The Committee noted that the present upkeep and maintenance of the buildings and other services of the Institute is very poor due to non-availability of sufficient funds. The Committee, therefore, recommends that realistic norms should be worked out for these items and on that basis, suitable funds should be provided.

(iii) The Committee also recommends the strengthening of the Central Workshop facilities in the Institute so that all the departments of the Institute can take necessary help and services from the Central Workshop.

6.2.6 Administration

(i) The middle level management of the Institute consisting of the Registrar and similar authorities met the Committee. Arising out of the discussions the Committee had with these people, the Committee recommends that there should be Inter-action between the administration and the Faculty. Wherever the Faculty lays down the policies which are to be implemented or executed by the administration, there should be proper co-ordination and co-operation between the two. For this purpose, wherever necessary, the administration should be suitably represented in the Academic Committees, etc.

(ii) Similar to the facilities given to the Faculty for getting further training in their specialised areas, arrangements for "In-Service Training", deputation to management training programmes, etc. should be provided to the middle level management people of the Institute.

(iii) Instead of giving increments in an ad-hoc manner, appropriate incentives should be worked out and based on these norms, such incentives should be given for all categories of staff.

6.2.7 Faculty Staffing

(i) Presently the sanctioned strength of Faculty is 245 which comprises as follows :

(a) Professor	25
(b) Associate Professor	25
(c) Assistant Professor	120
(d) Lecturer	75
	<hr/>
Total	245
	<hr/>

This gives a ratio of 1 : 1 : 5 : 3.

(ii) In the 4th Five Year Plan Projection, the Institute has asked for the following positions in the Faculty (ultimate) :

(a) Professor	50
(b) Associate Professor	50
(c) Assistant Professor	150
(d) Lecturer	100
	<hr/>
Total	350
	<hr/>

This gives a ratio of 1 : 1 : 3 : 2. In this connection, the problems of age saturation, salary saturation, saturation of the number of posts due to constraints imposed by the number due to budgetary control, etc. were discussed by the Committee. The following are the comments/suggestions of the Committee in this regard:—

- (a) The present anomaly of having contract appointments in the case of Associate Professors only should be discontinued. All the Faculty members in all the grades should be treated on the same footing;

- (b) In order to provide for contingencies and to retain good Faculty members, posts upto 10% of the sanctioned strength should be allowed to be kept on supernumerary basis.
- (c) Promotion should be on individual merit basis. In the case of outstanding staff 'Personal Grades' should be adopted.
- (d) The Committee felt that 350 Faculty Positions projected by the Institute at the end of the 4th Five Year Plan is reasonable. The 'mix' of this strength of 350 should be:—

(i) Professor and Associate Professor	100
(ii) Assistant Professor	150
(iii) Lecturer	100
Total	350

This gives a ratio of 2 : 3 : 2.

The above ratio is only a guide-line and there should be sufficient flexibility given to the Institute, subject to the proviso, that the total "budget ceiling" on 'Faculty Expenditure' should not be exceeded. This would give enough flexibility to the Institute to give promotion in deserving cases, etc. This would, to a certain extent, help in removing the problem of age saturation, salary saturation, etc.

- (e) The Committee noted with concern that due to the peculiar nature of the discipline, the present scales of pay do not attract good Faculty in the Aeronautical Engineering and Sanitary Engineering branches. Very few people are available and they are picked up for other lucrative jobs in the field and industry. Therefore, extra incentives might be considered for Faculty Members to be recruited for Aeronautical Engineering and Sanitary Engineering disciplines.

As already pointed out by the Committee, there is imbalance of staff strength in the departments. Keeping the broad objective of Inter-disciplinary Programmes to come in a big way, and adopting Joint Appointments and Appointment Across Departments, the Institute should plan its future Faculty recruitment in such a way that the existing imbalances are removed.

6.2.8 Funding

(i) The Committee discussed at length regarding the funding of the Institute on the present activities and on the proposed activities projected by the Institute. The Committee would like that the amount of Rs. 308 lakhs comprising of Rs. 260 lakhs on developmental plans and Rs. 48 lakhs on new Schemes should be redeployed and restructured in such a way that the above recommendations made by the Committee are properly implemented.

(ii) The Committee further recommends that new research and developmental activities to be undertaken by the Institute should be funded by the User Agencies. That is to say while the teaching programmes of the Institute will be funded by the Government of India, the research programmes of the Institute should be supported by men, material and money from the User Agencies. A statement showing the assistance received by the Indian Institute of Technology, Kanpur, on the research programmes sponsored by outside agencies, is given at Appendix VIII.

6.2.9 Students' Amenities

The Director informed the Committee that additional students' amenities in the form of Open Air Theatre with attached facilities should be provided from out of the allocations made during the 4th Five Year Plan. The Committee recommends that high priority should be given to this part of the work. The students' amenities complex proposed by the Institute out of the financial allocations of 4th Five Year Plan is expected to cost about Rs. 25 lakhs. It was also noted by the Committee that students have voluntarily contributed Rs. 50,000/- and with additional funds provided by the Institute, a Swimming Pool is under construction.

6.2.10 Building Space

The Committee would recommend for the deployment of the existing building space of the Institute so as to successfully implement the recommendations given above. During the discussions (August, 1970) the Institute did not press for additional building space.

6.2.11 Scholarships

The Committee noted that there is built-in provision for payment of scholarships to a large number of students of the Institute. 25% of the students in the Engineering discipline are covered by the Merit-cum-Means Scholarship and Pure Merit Scholarship Scheme. The Head of the Department of Chemistry pointed out the disparity in the quantum of Scholarship amount given to M. Sc. and Ph. D. students of Indian Institute

of Technology as against the quantum of scholarship allowed by organisations like C. S. I. R. The Committee recommends that this disparity should be removed.

6.2.12 Equipment

As already mentioned in 3.14, the Institute has given a list of items of equipment imported from abroad and costing more than \$ 5,000 apiece. On scrutiny of this list, it was observed that there is duplication of some costly equipment. This, perhaps, is due to the fact that the equipment were procured on departmental basis. This kind of duplication of costly equipment should be avoided in future. Hence, the Committee has recommended for Inter-disciplinary programmes and the pooling of men, material, resources and space, so that these resources are utilized at the optimum level.

6.2.13 Surplus land available with the Institute

The Institute has acquired a total area of about 1,200 acres. The present activities of the Institute would require about 400 to 500 acres of land by way of instructional buildings, workshop, residential complex, hostels, etc. In the foreseeable future, even with the expansion of activities of Indian Institute of Technology, Kanpur, all this area of 1,200 acres may not be fully required. The Committee would, therefore, suggest to put the surplus land available with the Institute for productive use. One way of using this surplus land may be by cultivation; another way might be to put up an Industrial Estate on the periphery of the Campus and to encourage young entrepreneurs to start small scale industries which would have relevance to the R and D activities of the Institute. One can also think of establishing Centres or Extension Centres of similar academic and R and D Organisations in the Campus whose activities could be of mutual help to the institutions located in the Campus.

6.2.14 Special problems with regard to Aeronautical Engineering Course

The department is suffering very badly for want of proper equipment and faculty. It requires huge funds for properly running the Aeronautical Engineering Department. Because of the lucrative jobs available in the country and abroad, the department is not able to recruit and retain good faculty Members, at the present levels of salary scales offered by the Institute. Sufficient monetary resources are not available for the department for capital equipment and running expenditure. It was further noted by the Committee that the User Agencies like Ministry of Defence, Air Force, Civil Aviation Department, etc., do not provide adequate support for running this department. In view of these difficulties, the Committee is constrained to recommend the suspension of Under-Graduate

Programmes of the Aero-nautical Engineering Department. In a restrictive way, with the resources available with the department, it may run the Post-graduate and Research Programmes only. The position should be reviewed when adequate support in the form of funds equipment, loan of personnel for teaching work and offer of job positions to the students, come from the User Agencies.

6.2.15 Special problems with regard to Sanitary Engineering Division of the Civil Engineering Department

Here also the Sanitary Engineering Division is not able to attract and retain good Faculty. The Committee has already suggested Environmental Engineering including its allied subject areas to be taken up under the Inter-disciplinary Research Programmes. This area of air pollution, water pollution, wastage disposal, etc. is assuming more and more importance as Science, Technology and Industry develop in the country. The Committee recommends that suitable incentives should be given to attract and retain good faculty in this Division of Sanitary Engineering in the Institute. Suitable funds should also be allocated to encourage this division to take up more and more research work, in the areas relevant to the problems faced by the country.

6.2.16 Isolation of I. I. T. Students

This problem has already been discussed by the Committee under terms of reference 'b'. The Interaction between the students of the Indian Institute of Technology, Kanpur, with the students of the other Indian Institutes of Technology is existing in a very restricted sense—in the Inter-I. I. T. annual Sports Meet. Apart from this, there is no Interaction between the students of I. I. T., Kanpur, and the students of other I. I. Ts. The elected representatives of the students who met the Committee also emphasized about this problem. The Committee recommended that suitable steps should be taken and machinery evolved for the Interaction between the students of the Indian Institute of Technology, Kanpur, and the other Indian Institutes of Technology. Perhaps at the Masters level and at the Ph. D. level, the students of one I. I. T. can come and do project work in another I. I. T. If possible, this could be extended to project work done at the Under-Graduate level also. Industrial tours for students of two or three Indian Institutes of Technology, in batches, could be arranged. In this and in several other ways, there should be more scope for Interaction between the students of I. I. T., Kanpur, and the students of other Indian Institutes of Technology and the Indian Institute of Science, Bangalore.

The same position holds good regarding students of the Indian Institute of Technology, Kanpur, and students of other Engineering Colleges,

in the region and in the country. Although the I. I. T., Kanpur, draws its students from all over the country and thus has got a national and cosmopolitan character, contact as between the students of I. I. T., Kanpur, and students of other Institutions in the neighbourhood have not been established. Ways and means should be found out to break the ice so that students of I. I. T., Kanpur, do not have the feeling of isolation.

6.2.17 Training and Placement Work

The subject of the need for a Placement Officer for I. I. T., Kanpur, was discussed in detail in the discussion held with the Placement Committee. Opinions both for and against were expressed in respect of institution of a post called Placement Officer. In the present context of unemployment of Engineers and keen competition amongst the applicants, the Committee felt that there is a need for a Placement Officer for the students of the Institute. He would work as a liaison officer between the students, Institute and the Industry. No doubt the Placement Officer should work in close co-operation and under the directions of the various departments. His duty will be as that of Salesman—to sell the products of I. I. T., Kanpur, in a highly competitive market. The Committee would recommend the Institution of a post of Placement Officer and for recruitment of a suitable incumbent in that post. The post would be in the Professor's cadre. He will also co-ordinate work relating to Industrial entrepreneurship, liaison with industry, liaison with R and D organisations, Quality Improvement Programmes, and other allied matters. We can even suggest a designation for him as "Training, Placement and Industrial Relations Officer". He should be provided with suitable office and secretarial assistance.

CHAPTER—7

RECOMMENDATIONS/OBSERVATIONS OF THE COMMITTEE ON TERM OF REFERENCE (e)

Here the Committee is going to discuss term "e" of reference namely :

"To report on any other aspect or aspects, that are relevant to the overall functioning of the Institute".

7.1 The Committee considered the Decennium Report 1960—70 submitted by the Institute. In this report, apart from the introduction of the Director, statistical details regarding admissions, students' enrolment, out-turn, faculty strength, expenditure incurred, etc. etc. the individual Departments have given detailed information on the basis of current activities and also on the basis of future projections of the Departments. The Committee discussed the reports of these Departments with the Faculty of each Department, which met the Committee in the one hour sessions held on the 4th and 5th of August, 1970.

7.2 The Committee observed that the current activities and future projections given by the Departments are generally based on "Departmental" basis rather than on "Programme" basis. The Committee has already discussed details and has given the recommendations with regard to the need for Inter-disciplinary Programmes and how to execute them. Against this background, the Committee decided not to give any department-wise recommendations. The Committee would suggest to the Director and other authorities of the Institute to redeploy and re-structure the requirements by way of space, equipment, furniture, library and faculty positions in such a way, that the programmes as suggested by the Committee are implemented within the financial sanctions allotted during the Fourth Five Year Plan.

7.3 With regard to new activities envisaged by the Institute, the Committee has already recommended that the funding for these programmes should be found from External Sources/User Agencies who would be interested in the results of these Programmes.

7.4 In this way the Committee, after assessing the good work done by the Institute, has laid down broad policy guidelines to be implemented by the Institute. The Committee would urge upon the grant giving Authorities like the Ministry of Education and Social Welfare (Govt. of India), other R and D Organisations and User Agencies to provide adequate funds for the proper implementation of the recommendations given in this report.

CHAPTER—8

RECOMMENDATIONS/OBSERVATIONS OF THE COMMITTEE OF THEIR FINAL MEETING HELD AT BANGALORE ON THE 7TH & 8TH FEBRUARY, 1973.

8.1 The Reviewing Committee had their first meeting in August, 1970 at the Indian Institute of Technology, Kanpur. The draft report was circulated to the members of the Committee in November, 1970. Comments were received from some members of the Committee. Normally, the report could have been finalised after receipt of the comments from the members.

8.2 However due to term of reference "d", a meeting of all the Secretaries and Chairmen of the Reviewing Committees of the five Indian Institutes of Technology and Indian Institute of Science, Bangalore was held in May, 1971. Arising out of this Bangalore meeting, a full dress meeting of all the members of all the six Reviewing Committees was to be held subsequently in Delhi. Due to various reasons, this meeting could not take place. In the meanwhile Shri S. Sadasivam, Secretary of the Reviewing Committee, Indian Institute of Technology, Kanpur, was transferred to Calcutta and he had an assignment for a short term in U. K. He was also given the responsibility of the Secretary-ship of the Reviewing Committee, Indian Institute of Technology, Kharagpur. Subsequently, he was transferred back to Northern Regional Office, Kanpur. Comments from a member of the Reviewing Committee were received only in October, 1972. Due to these and other various reasons beyond the control of the Committee, an immediate subsequent meeting of the Reviewing Committee could not be held. This has led to the unfortunate delay in finalisation of the report.

8.3 The Committee subsequently met at the Indian Institute of Science, Bangalore on the 7th and 8th February, 1973 to finalise the report. As already stated in Para 2.9, many changes have happened in the development of the Institute during this period.

8.4 The Committee took note of the important fact that the KANPUR INDO-AMERICAN PROGRAMME terminated by June, 1972, as per the original terms of the aid agreements. Due to the political developments in the country vis-a-vis the U. S. A., the much awaited Post Project Aid did not come through. The Aid Programme came to a sort of abrupt termination. This abrupt termination has naturally caused some stresses and strains in the growth of the Institute.

8.5 This is the last year of the Fourth Five Year Plan and the Institute has prepared an Approach Paper giving their Fifth Five Year Plan proposals and projections. The Director of the Institute has written a letter to the Chairman on 1st February, 1973 highlighting the important points in their Fifth Five Year Plan proposals and requesting support of the Reviewing Committee for these proposals. Copy of letter dated 1st February, 1973 from the Director addressed to the Chairman is at Appendix X.

8.6 The Director also gave a copy of the Institute's Approach Paper containing proposals of the Fifth Five Year Plan, to the Secretary, for placing before the meeting of the Reviewing Committee. The Committee had a general discussion on the points raised in the Director's letter dated 1st February, 1973 and about the guidelines for the growth of the Institute during the Fifth Five Year Plan. In the changed situation, the Committee took up the following important points for consideration.

8.7 Building Space

The Institute has informed that about 20% of the Building space by way of Instructional Buildings, students' amenities complex, residential buildings etc. etc. costing about Rs. 146 lakhs is yet to be built. This comprises of :

I. Institutional Buildings

	Sq. m.	Sq. ft.
Total plinth area originally planned	81,884	(8,80,521)
Institutional buildings actually built (as of now)	73,053	(7,85,521)
To be built	8,835	(95,000)

II. Community Buildings

Total originally planned	9,316	(1,00,174)
Actually built (as of now)	8,300	(88,174)
To be built	1,116	(12,000)

iii. Residential Buildings

Total originally planned	(Nos)	1001
Actually built (1972)	(Nos)	822
To be built	(Nos)	179

The Committee considered this and observed that the Building space requirements of the Institute may be suitably worked out keeping in view that the ultimate student population would be 2000, comprising 1000 Post-graduates and 1000 Under-graduates and the faculty strength would be 350. Keeping this faculty strength and students strength in view, and the present and projected activities of the Institute, suitable norms may be worked out and the existing shortages, in Building space requirements should be fulfilled. Necessary funds for this purpose should be provided to the Institute.

8.8 Equipment

The Institute has asked for provision of funds under three broad headings—Obsolescence Removal, Consolidation and Developmental expenditure.

(i) Obsolescence Removal

This is a common problem faced by all the Indian Institutes of Technology. Depending upon the inputs, a suitable provision, worked out as a percentage of the inputs can be worked out for all the Indian Institutes of Technology and appropriate amount under this head should be provided to the Institute.

(ii) Replacement

A large amount of sophisticated U. S. Equipments has been acquired in the Institute. The U. S. Aid Programme has terminated. The Institute should look for replacement of indigenous spares wherever possible. Further acquiring of equipments should have relevance to these factors.

(iii) Equipment for Developmental activities

The Committee has already dealt and given its recommendation with regard to future academic and research programmes of the Institute. Any new programme should be started only after joint discussions with other Indian Institutes of Technology, other institutions in India and also after ascertaining the

views of the User Agencies. Substantial portion of the inputs under this head should come from the User Agencies. We may give some examples here :

Name of the Project	Resources to come from
(i) Gas Turbine Project	Civil Aviation and Defence.
(ii) Nuclear Engg.	Deptt. of Atomic Energy.
(iii) Material Science	Deptt. of Electronics.
(iv) Ground Water Resources	Ground Water Board of the Irrigation Ministry and their counterparts in the various states.

Thus the User Agencies will supply the bulk of equipment needed for Developmental activities.

8.9 Computer Centre

The Institute has asked for installation of a fast Third Generation Computer like CDC—6600 or IBM 370/165 or equivalent system in replacement of the existing Computer system (IBM 1620 and IBM 7044/1401). The Committee observes that Indian Institute of Technology, Kanpur is the only teaching institution training high quality Computer Scientists and it has competent faculty in the Computer Centre. Indian Institute of Technology, Kanpur has also the largest configuration of physical equipment by way of extensive hardware facilities available in the teaching institutions.

In view of the good work done by the Computer Centre, the Committee commends that all support should be provided to sustain their teaching and research programmes. Therefore, the Committee recommends the provision of a Third Generation Computer like the one which has been installed at Indian Institute of Technology, Madras.

8.10 Library

The present level of recurring expenditure for the library is Rs. 7.67 lakhs per annum. The Institute has asked for a budget provision of Rs. 45 lakhs in the Fifth Five Year Plan period. The Committee recommends as under:

- (i) The existing level of expenditure should be maintained.
- (ii) In highly specialised areas, there should be mutual consulta-

tion between the Indian Institutes of Technology and the acquisition of books and titles should be made in such a way that costly duplication of highly specialised books can be avoided. In this way a large number of specialised areas can be covered with the given resources to the various Indian Institutes of Technology. This possibility can be explored in the common forum of the Council of Indian Institutes of Technology.

- (iii) As interest in research areas keeps on changing, the subscription list should also be revised suitably to discard unwanted journals and publications and to include the wanted items, enabling the Institute to have a dynamic library, catering to the varied and changing interests of the Institute. This will also keep the expenditure on the library to a reasonable level.

8.11 Faculty

The Committee reiterates that the Faculty strength should be as under :

Keeping in view the ultimate student strength of 2000 (1000 post-graduate plus 1000 under-graduate, the faculty strength will be :

Professors and Associate Professors	...	100
Assistant Professors	...	150
Lecturers	...	100

8.12 Relative expenditure on salaries and allowances as between teaching faculty, technical supporting staff, administrative staff etc. etc.

The staff salary bills can be broken up into the following four broad categories :—

- (i) Teaching faculty
- (ii) Technical supporting staff
- (iii) Administrative supporting staff
- (iv) Staff employed on Municipal Services.

The break up of the salary bills for the years 1972-73 and 1973-74 is given below :

Categories	1972-73	Percentage of Total pay and Allowances	1973-74	Percentage of Total pay and Allowances
	Rs in lakhs		Rs. in lakhs	
Faculty	47.08	36.26%	49.03	34.02%
Technical Support Staff	36.04	27.76%	43.51	30.19%
Administrative Support Staff	23.21	17.87%	27.18	18.86%
Municipal Services	23.52	18.11%	24.41	16.93%
Total :	129.85		144.13	

The above analysis shows that more funds are spent on supporting services than on the teaching faculty. This is a premier teaching and research Institute. The weightage in expenditure should be for the teaching faculty, then technical supporting staff, then administrative supporting staff and lastly for the staff on municipal services, coming down in that order. In order to rectify the situation, the Committee would suggest the following broad pattern of break up of salary bills.

Teaching faculty	45%
Technical supporting staff	25%
Administrative Supporting staff	15%
Municipal Services	15%

The idea is that out of every Rs. 100/- spent on the salary bills by the Institute. Rs. 45/- should go for the teaching faculty, Rs. 25/- to the technical supporting staff and so on. These are not absolutely rigid figures. Keeping the main objective of the Institute, the staff structure should be patterned out to conform to the guidelines given above.

8.13 3-Year Engg. Degree Programme For B. Sc. Pass Students

The Committee noted the consensus arrived at in the meeting of the Chairmen and Secretaries of all the Reviewing Committees held in Bangalore on 24th and 25th May, 1971 which recommends the abolition of the existing five year under-graduate engineering programme in all the Indian Institutes of Technology and for introducing, uniformly, in all the Indian Institutes of Technology, a three year undergraduate engineering course, to which minimum admission qualification would be a pass in B. Sc.

The Committee has no particular views either in favour or against the consensus mentioned above.

8.14 M. Sc. Integrated Course in Science and Mathematics subjects

The Committee understands that Indian Institute of Technology, Kanpur, has introduced a five year integrated M. Sc. course in Physics, Chemistry and Maths. (entering point pass in Higher Secondary or equivalent). The Committee is categorically not in favour of the introduction of this five year integrated M. Sc. course. The Committee would like to reiterate their earlier views expressed in para 6.2.2 commending the introduction of a "Hybrid Course" for the restricted number of students to be branched off after the third year level, in the existing five year integrated engineering programme.

8.15 Interdisciplinary Programmes

The Computer Centre, Materials Science Centre and Nuclear Engineering and Science Centre are present activities under the Interdisciplinary programmes of the Institute. In the Fifth Five Year Plan the Institute proposes two more interdisciplinary programmes: (i) Design and Development Centre for Engineering System (ii) Industrial Engineering, Production Technology and Industrial Management Centre. While commending these programmes, the Committee would like to emphasize that such activities and research programmes should be primarily sponsored by the User Agencies and funding for these new projects should come from these agencies.

8.16 Streams of employment of the products of the Institute

On the request of the Committee, the Institute has given a statement showing the placement of students who have passed out from the Institute, who have taken up jobs in India and abroad. This statement is given in Appendix II. The jobs have been classified into three main groups—Industrial Sector, R and D Activities and Teaching Jobs. Analysis of this statement shows that the products of the Indian Institute of Technology, Kanpur, have taken up employment largely in the Industrial Sector and quite a few have taken up jobs in R and D Organisations and in Teaching Institutions. The Committee notes with satisfaction that the products of the Institute have contributed to the nation by taking up employment in the Industrial Sector, R and D Activities and Teaching positions. As already observed by the Committee in 5.5, the Committee would like to emphasize that in order that the best talent coming out

from the Institute is available for the National Development work of the country, the employing agencies in the country should suitably motivate the students and give them suitable job positions.

8.17 General

The more important policy recommendations of the Committee are summarized in Chapter 2.

CHAPTER—9

ACKNOWLEDGMENT

9.1 The Chairman and the Members of the Committee are grateful to the Director and other staff-members of the Indian Institute of Technology, Kanpur, for giving them all help, material and information which the Committee wanted for preparing this report.

9.2 The Committee would also like to place on record their appreciation of the work done by the Secretary of the Committee—Shri S. Sadasivam.

Dr. S. Bhagavantam	Chairman
Dr. V. Ranganathan	Member
Dr. R. Narasimhan	Member
Dr. Jagdish Lal	Member
Gujarmal Modi	Member
S. Sadasivam	Secretary

APPENDIX I
(Ref. 1.2)

(TO BE PUBLISHED IN THE GAZETTE OF INDIA PART I SECTION I)

No. F. 5—11/68-T.6
Government of India, Ministry of Education
& Youth Services

New Delhi, the 31st March, 1970

RESOLUTION

Whereas Sub-section (2) of section 9 of the Institutes of Technology Act, 1961 (59 of 1961) provides a review of the work and progress of the Institutes of Technology by a reviewing Committee.

Now, therefore, in exercise of the powers vested in him under the said sub-section (2) of section 9, the President of India, in his capacity as the Visitor of the Institute has appointed a Reviewing Committee to review the working of the Indian Institute of Technology, Kanpur, with the composition and terms of reference as below :

Composition

- | | |
|--|----------|
| 1. Dr. S. Bhagawantam
17, Tinmurthi Marg,
New Delhi. | Chairman |
| 2. Dr. Jagdish Lal,
Principal,
Motilal Nehru Regional Engg. College,
Allahabad. | Member |
| 3. Dr. V. Ranganathan,
Chief (Science),
Planning Commission,
New Delhi-1. | Member |

- | | | |
|----|--|-----------|
| 4. | Shri G. M. Modi,
Modi Enterprises,
Modinagar (U. P.). | Member |
| 5. | Shri R. Narasimham
Head of Department of Computer Science,
Tata Institute of Fundamental Research,
Bombay-5 | Member |
| 6. | Shri S. Sadasivam,
Asstt. Educational Adviser (Technical)
Northern Regional Office,
Ministry of Education & Y. S.,
Kanpur. | Secretary |

Terms of Reference

- (a) To review the present progress of the Institutes of Technology in the fulfilment of its broad objective.
 - (b) To examine how far the Institute has inter-acted with other technical institutes with particular reference to courses of study, programmes of research and faculty development;
 - (c) To assess the overall impact of the Institute on the training of highgrade engineers for the technological development of the country;
 - (d) To recommend the lines along which the Institute should be further developed for advanced studies and research, taking into account the developments that have taken place or are projected at the other Institutes of Technology and the Indian Institute of Science, Bangalore; and
 - (e) To report on any other aspect or aspects that are relevant to the overall functioning of the Institute.
2. The Committee shall start functioning at the Institute in April, 1970.

Sd/-L. S. CHANDRAKANT
Joint Educational Adviser (T)

Ordered that a copy of the Resolution be forwarded to:—

1. All State Governments/Union Territories.

2. Chief Secretary to the Government of U. P., Lucknow.
3. Registrar, Indian Institute of Technology, Kanpur.
4. Chairman, Members and Secretary of the Committee.
5. All Ministries of the Government of India.
6. Chairman, University Grants Commission, New Delhi.

and that the Resolution be published in the Gazette of India.

The Manager, Govt. of India Press, New Delhi.

Sd/- L. S. CHANDRAKANT
Joint Educational Adviser(T)

APPENDIX II
(Ref. 8.16)

Placement of Students in India and abroad

	In India	Abroad
(a) Input into the Industrial Sector-Private and Public Sectors, Defence, Small Scale Industries and self-employment :	1027	65**
(b) Input into R and D activities—In Defence Department, Department of Atomic Energy C. S. I. R., Central Water and Power Commission, Tata Instt. of Fundamental Research and similar other organisations;	127	*
(c) Input into Teaching Institution as Faculty	243	*
Students doing higher studies in India	236	
Status not forthcoming	213	

** Out of total of 527 students went for higher studies, information on the remaining nos. is not available.

* Of these graduates employed in foreign countries many of them may be in R and D Units and Teaching Professions, the position of which is not known.

APPENDIX III

(Ref. 2.7)

The General Consensus of the Bangalore Meeting Attended by the Chairmen and the Secretaries of the Reviewing Committee

The Chairmen and Secretaries of the Reviewing Committees of the Indian Institute of Science, Bangalore, and the five Indian Institutes of Technology met at the Indian Institute of Science, Bangalore, on 24th of May, 1971 to consider various problems and issues of common interest and relevance to the work of all the Reviewing Committees appointed by the President of India.

The following were present —

1. Dr. T. R. Seshadri
2. Dr. S. Bhagavantham
3. Dr. P. L. Bhatnagar
4. Dr. H. N. Sethna
5. Shri M. R. Chopra
6. Shri D. V. Narasimham
7. Shri K. N. Sundaram
8. Shri S. Sadasivam
9. Shri G. N. Vaswani
10. Shri M. S. Srinivasan.

Shri G. Pande regretted his inability to attend the meeting.

The Committee considered at length the various issues and came to certain views and consensus in respect of these problems. The issues considered and the views expressed are given below :

1 Post-graduate and under-graduate courses

The general consensus was that the Indian Institutes of Technology should mainly concentrate on programmes in Engineering and Technology and largely on post-graduate programmes, research and advanced work.

Facilities for under-graduate programmes may be continued with limited admissions.

2 Pattern of under-graduate courses

There was a consensus that all the Institutes of Technology should provide facilities for three year Bachelor's degree programme in Engineering/Technology after B. Sc. instead of the present 5-year integrated degree programmes. There was also agreement that the Institutes of Technology should not conduct Bachelor's degree programmes in Science after higher secondary school certificate. It was, however, proposed that the members of all the Reviewing Committees of the Indian Institute of Science, Bangalore and the Indian Institutes of Technology should meet to consider this matter. It was further decided that such a meeting may be convened at the Indian Institute of Technology, Delhi, on 5th July, 1971 at 10.30 a.m. to discuss the following item :

“To consider whether all the Indian Institutes of Technology should switch over to only one pattern of under-graduate programmes in Engineering/Tech. after the B. Sc. instead of the present five-year under-graduate programmes after the Higher Secondary School Certificate.”

3 Proliferation of post-graduate programmes-Inter-disciplinary and other research/projects/programmes.

The general consensus was that before any new post-graduate programmes and/or any inter-disciplinary and other research projects/programmes are undertaken, concerned representatives of the Institutes as well as the National Laboratories should jointly consider the programmes/projects problems so that there is no unnecessary multiplication and if necessary certain aspects of the projects/programmes may be undertaken by the Institutes which have the necessary facilities by way of laboratories, equipment, expertise, etc. Advance planning and interaction is necessary between the Institutes and the National Laboratories before any new post-graduate programmes and inter-disciplinary and other research programmes/projects are undertaken by the Institutes and the National Laboratories. It is absolutely essential to establish this liaison with a view to avoiding proliferation of programmes and conserving scarce resources of the country.

Further, the new programmes undertaken should have relevance to the economy of the country and provide adequate employment opportunities for the personnel so trained. The Council of the Indian Institute of Technology should also keep a watch on the development of such programmes and ensure proper co-ordination.

4 Duration of Master's degree courses

The general view was that the duration of Master's degree courses in Engineering/Technology should continue to be 2 years but the contents of the courses be reviewed and if necessary revised to bring them to uniform standard.

5 Teacher-student ratio and staff mix

The general view was that teacher-student ratio may be of the order of 1 : 5 to 7 and the staff mix should not be low pyramid and there should be larger proportion of senior staff i.e. Professors and Assistant Professors.

6 Pattern and structure of academic vis-a-vis non-academic i.e. technical supporting and administrative staff

It was felt that the expenditure on salaries including allowances, provident fund etc. on non-academic staff vis-a-vis academic staff was very much on the high side. It was therefore suggested that expenditure on academic staff should be about 60% and on technical staff upto 25% and on administrative and supporting staff upto 15%.

7 Terms of appointment of academic staff

The general view was that the system of making appointments of five-year contract basis with a provision for renewal of the contract was not desirable and it is necessary that the academic staff should be provided certain stability in their tenure. It was, therefore, felt that initially staff members may be appointed on probation up to 3 years so that the Institutes on the one hand and the staff on the other get enough time and opportunity to familiarise themselves with the work condition etc. Before the expiry of the probation period, there should be an assessment by an independent Committee and after this assessment, the appointment if renewed, may be made on long term basis. Further, there should be continuous assessment and the services of the staff member may be terminated if he does not function properly or adequately. Such assessment should also be made by an independent committee.

8 Provision for adequate facilities for academic staff

It was suggested that before appointing any senior staff, adequate facilities should be provided to the staff by way of laboratory space, equipment, supporting staff etc., before they join. The consensus was that in many cases it had been observed that the appointments are

made without providing adequate facilities and the staff is not able to do the proper academic and/or research work. Such situation should be avoided at all costs to prevent frustration and deterioration of academic atmosphere.

9 Heads of Departments

It was noted that the practice in this behalf varies from Institute to Institute. In some Institutions there are permanent Heads of Departments and in some, Heads are appointed by rotation. It was felt that each system has its good and bad points. However, the general consensus was that it is necessary to have good management and change should be made not as a rule for the sake of change but should be made only when the change is considered necessary. Further, the Departments should be so organised that they do not suffer because of the change in the headship of the Department. In other words, it was felt that there should not be so much concentration of power that the change in the headship affects the running of the Department.

10 Merit promotions

The general view was that while there should be provision for merit promotions, the assessment for effecting these promotions should be made by independent committees on the same pattern as it is done for selection through the open market. The assessment processes should be very strict and thorough. Persons given the merit promotion should so far as possible be adjusted against the vacant posts, if any. In case there are no vacant posts in that particular cadre, not more than equivalent of 10% of the sanctioned senior posts may be filled by merit promotion. In such cases, lower posts may be kept in abeyance till the persons promoted are absorbed in senior position on regular basis.

11 Student Welfare

It was felt that in residential campuses, adequate attention should be given to students welfare and essential amenities like dispensary, canteen, swimming pool, gymkhana, open air theatre and/or auditorium, should be provided depending on the location and climate of each Institute and also availability of funds. It was also felt that the quality of food provided to the students was very much below the required standard and it was necessary to give greater attention to the nourishment of students and appropriate steps should be taken by the Institutes to provide good quality food so that the health of students is not affected

12 Liaison with industry

There was a very strong feeling that there should be close liaison between the Institutes, industry and Government and other technical orga-

nisations/departments on the one hand and the Institutes and technical institutions on the other, to enable the industry and technical organisations/institutions to know what type of technology—oriented work the Institutes can do and assist them in their development. It was felt that there should be a unit/cell within each Institute under a person not below the rank of a Professor to bring about this rapport between the organisations interested in the development of the technologically oriented work/problem and help students of the Institutes in securing suitable employment and/or training facilities. This unit besides the liaison work, may also undertake publicity work to enable the general public to know the type of work it can do in the educational, industrial, technical and other fields. This unit should also maintain a roster of Institute alumni.

13 Orientation of research

There was a general consensus that the Institutes should concentrate on technology-oriented research and the projects/programmes undertaken should have relevance to the national economy and help in the development of the country. Research may be training-oriented, but it should not be of such a fundamental nature that it has no relevance to the economic problems of the country. Further, research may be discipline-oriented but the design work should be project-oriented. There was a strong feeling that even the research projects undertaken under foreign assistance programmes besides being of mutual interest should be closely related to the concrete problems of the country.

APPENDIX IV

(Ref. 3 5)

INDIAN INSTITUTE OF TECHNOLOGY, KANPUR
GROWTH OF THE INSTITUTE

Statement showing integrated Out-turn figures of the various courses

Year	B. Tech.		M. Tech.		Ph. D. (Engg.)		M.Sc. (Sc.)		Ph. D. (Science)	
	Intake	Out-turn	Intake	Out-turn	Intake	Out-turn	Intake	Out-turn	Intake	Out-turn
1960-61	100									
1961-62	100									
1962-63	100									
1963-64	250									
1964-65	300	65	27	--	10	--	17	--	36	2
1965-66	300	85	62	15	16	--	29	13	70	1
1966-67	300	83	143	17	17	--	40	17	67	13
1967-68	300	164	189	48	33	1	35	28	57	21
1968-69	250	197	146	89	32	5	37	26	67	28
1969-70	250	234	224	107	39	9	42	30	67	26
1970-71	250	243	120	116	43	12	44	30	53	33
1971-72	250	269	207	143	61	15	34	35	70	27
1972-73	250	--	157	--	48	--	41	--	41	--

APPENDIX V

(REF. 3.13)

LIST OF KIAP STATE WHO CAME TO INDIAN INSTITUTE OF TECHNOLOGY, KANPUR

Sl. No.	Name	Rank	Department	Duration (in months)
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CALIFORNIA INSTITUTE OF TECHNOLOGY

1.	Robert A. Huttenback	Asstt. Prof.	History	12
2.	Peter V. Mason	Asstt. Prof.	Elec. Engg.	17
3.	David F. Welch	Assoc. Prof.	Mech. Engg.	16
4.	Richard L. Carrouche	Ins. Specialist	Elec. Engg.	14
5.	John B. Trenholme	Grad. Res. Asstt.	Elec. Engg.	12
6.	Peter W. Fay	Assoc. Prof.	History	21
7.	John Mathews	Assoc. Prof.	Physics	13
8.	E. B. Hugg	Asstt. Director	Arch. Consultant	17
9.	Taras Kiceniuk	Lecturer	Mech. Engg.	22
10.	W. H. Padgham	Personnel Man.	Administration	1
11.	T. B. Brandt	Section Man.	Central W/shop	24
12.	T. Vrebalovich	Sys. Scientist	Aero. Engg.	24
13.	C. E. Nichols	Sr. Staff Asstt.	Administration	36
14.	C. M. Berdahl	Chief	Instrumentation	24
15.	R. G. Harrison	Sr. Engineer	Instrumentation	19
16.	D. L. Roth	Chem. Lib.	Library	16

CARNEGIE-MELLON UNIVERSITY

17.	G. J. Derge	Professor	Met. Engg.	8
18.	T. P. Kohman	Professor	Chemistry	13
19.	N. C. Seeber	Asstt. Prof.	Economics	20
20.	J. G. Fox	Professor	Physics, Prog. Leader	35

Sl. No.	Name	Rank	Department	Duration (in months)
21.	S. P. Franklin	Asstt. Prof.	Mathematics	22
22.	R. A. Alo	Asstt. Prof.	Mathematics	12
23.	A. G. Jordan	Professor	Elec. Engg.	2
24.	H. Reedy	Supervising Technician	Elec. Engg.	3

CASE WESTERN RESERVE UNIVERSITY

25.	W. F. Schneerer	Assoc. Prof.	Mech/Civil Engg.	2
26.	E. B. Leach	Assoc. Prof.	Mathematics	12
27.	A. H. Benade	Assoc. Prof.	Physics	14
28.	R. R. Archer	Assoc. Prof.	Civil Engg.	19
29.	J. D. Pigott	Director	Physical Planning	12
30.	R. T. Paumen	Registrar	Sys. Consultant	12
31.	Morrell Heald	Assoc. Prof.	History	12
32.	R. A. Schermerhorn	Professor	Sociology	18

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

33.	N. C. Dahl	Professor of ME	Programme leader	26
34.	A. J. Erickson	Asstt. Prof.	Mech. Engg.	33
35.	W. F. Schreiber	Assoc. Prof.	Elec. Engg.	24
36.	Holt Ashley	Professor	Aero. Engg.	13
37.	D. N. Graham	Teaching Asstt.	Elec. Engg.	16
38.	L. D. Smullin	Professor	Elec. Engg.	12
39.	L. W. Ryan	Supervisor	Glass Blowing	12
40.	L. A. Shepard	Lecturer	Met. Engg.	19
41.	R. L. Halfman	Professor	Aero. Engg., Pro. Leader	39
42.	Dr. S. D. Clark	Assoc. Director	Medical	18
43.	H. H. Uhlig	Professor	Met. Engg.	1
44.	Mrs. I. Y. Johnson	Science Lib.	Library	23
45.	A. M. Richardson	Professor	Civil Engg.	22
46.	J. B. Goodenough	Group Leader, Lindoln	Lab. Chemistry	1
47.	J. L. Kerrebrock	Professor	Aero. Engg.	1

OHIO STATE UNIVERSITY

48.	R. H. Zimmerman	Professor	Mech. Engg.	20
49.	C. E. Dryden	Professor	Chem. Engg.	22
50.	W. B. Shook	Asstt. Prof.	Met. Engg.	22
51.	R. S. Green	Assoc. Dean	Programme Leader	24

Sl. No.	Name	Rank	Department	Duration (in months)
52.	G. E. Hayner	Tech. Asstt.	Graphic Arts	3
53.	John Bacon	Assoc. Prof.	Elec. Engg.	17
54.	C. T. West	Prof./Chairman	Mech. Engg.	21
55.	D. J. Wilhelm	Asstt. Prof.	Chem. Engg.	38
56.	M. G. Fontana	Prof./Chairman	Met. Engg.	1

PRINCETON UNIVERSITY

57.	I. N. Rabinowitz	Assoc. Director	Computer	16
58.	D. C. Hazen	Professor	Aero. Engg.	13
59.	R. F. Lehnert	Director of Supersonic	Lab. Aero. Engg.	2
60.	Edward Seckel	Professor	Aero. Engg.	8
61.	J. E. Snell	Asstt. Prof.	Civil Engg.	17
62.	F. S. Acton	Assoc. Prof.	Computer	16
63.	J. W. Olcott	Pilot Ins.	Aero. Engg.	18
64.	J. D. Brown	Dean of Faculty	—	1
65.	Marshall Sittig	Asstt. Director	Research Admn.	22
66.	M. E. Van Valkenburg	Prof./Chairman	Elec. Engg.	1
67.	R. P. Andres	Assoc. Prof.	Chem. Engg.	12
68.	R. B. Starbuck	Ana. Programmer	Admn. Officer	47
69.	Frits Dumpel	Ana. Programmer	Admn. Expert	23

PURDUE UNIVERSITY

70.	G. R. Meluck	Chief, Circu.	Library	23
71.	O. C. Dunn	Assoc. Director	Library	4
72.	D. A. Davenport	Assoc. Prof.	Chemistry	27
73.	V. E. Bergdolt	Professor	Mech. Engg.	12
74.	R. L. Funkhouser	Engg. Lib.	Library	24
75.	L. Z. Breen	Professor	Sociology	15
76.	T. B. Speaker	Consultant	Airconditioning	12
77.	W. E. Fontaine	Professor	Mech. Engg.	1
78.	H. R. Wilke	Professor	Civil Engg.	12
79.	R. L. Cain	Head, Reader Ser.	Library	17
80.	M. W. Pullan	Assoc. Prof.	Civil Engg.	17
81.	L. M. Baker	Professor	Psychology	17
82.	N. Khachaturian	Professor	Civil Engg.	10

Sl. No.	Name	Rank	Department	Duration (in months)
UNIVERSITY OF CALIFORNIA				
83.	Arthur Gill	Asstt. Prof.	Elec. Engg.	11
84.	H. D. Huskey	Professor	Computer	15
85.	A. R. Bergen	Assoc. Prof.	Elec. Engg.	15
86.	P. H. McGauhey	Chairman	Civil Engg.	1
87.	G. W. Brown	Assoc. Prof.	Mech. Engg.	17
88.	J. L. Kelley	Professor	Mathematics	14
89.	Gio Wiederhold	Head, Programming	Computer	12
90.	R. M. Lee	Res. Engineer	Computer	12
91.	B. J. Moyer	Professor	Physics	13
92.	J. E. Mayer	Chairman	Chemistry	2
93.	M. G. Mayer	Professor	Physics	2
94.	G. D. Johnson	Chief Programmer	Computer	26
95.	F. W. Hutchinson	Professor	Mech. Engg.	24
96.	S. E. Baker	Sr. Lab. Tech.	Workshop	12
97.	D. L. Stephenson	Asstt. Group Lea.	Elec. Engg.	12
98.	R. J. Hanson	Technician	Elec. Engg.	18
99.	M. F. Merriam	Assoc. Prof.	Met. Engg.	22
100.	H. L. Strauss	Assoc. Prof.	Chemistry	12
101.	E. J. Rand	Asstt. Prof.	English	26
102.	J. J. Huntzicker	Asstt. Prof.	Physics	12
UNIVERSITY OF MICHIGAN				
103.	G. L. Chavarria-Aguilar	Asstt. Prof.	English	21
104.	M. J. Kaldjian	Asstt. Prof.	Civil Engg.	22
105.	C. E. Elliott	Instructor	English	21
106.	A. W. Burks	Professor	Philosophy	17
107.	F. R. Suppe	Instructor	Philosophy	21
108.	Ray E. Kehoe	Assoc. Director	Schools	17
109.	G. J. Berg	Professor	Civil Engg.	24
110.	Mrs. M. E. Berg	Catalog Lib.	Library	24
111.	R. D. Woods	Asstt. Prof.	Civil Engg.	1
EDUCATION DEVELOPMENT CENTRE				
112.	J. E. Vielehr	On contract	Admn. Officer	28
113.	R. J. Wood	"	Arch. Consultant	22
114.	D. A. Montenegro	"	Elec. Engg.	30

Sl. No.	Name	Rank	Department	Duration (in months)
115.	G. J. Battaglia	On contract	Admn. Officer	24
116.	J. G. Steeves	"	Mech. Engg.	36
117.	G. N. Petievich	"	Admn. Officer	39
118.	J. Brokaw (Mrs.)	"	Schools	23
119.	Gilbert Oakley	Vice President	Programme Leader	34
120.	A. L. Reynolds	on contract	Schools	20
121.	R. C. Vogler	"	Arch. Consultant	38
122.	J. Chalufour	"	Television	7

**LIST OF INDIAN STAFF VISITING CONSORTIUM UNIVERSITIES UNDER
KIAP PROGRAMME (PARTICIPANT PROGRAMME)**

Sl. No.	Department	Name	Rank	Duration (in months)
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CALIFORNIA INSTITUTE OF TECHNOLOGY

1.	Chemistry	D. N. Dhar	Lecturer	12
2.	Precision Shop	J. C. Srivastava	Foreman	6

CARNECIE-MELLON UNIVERSITY

3.	Elec. Engg.	M. M. Hasan	Lecturer	24
4.	Computer	R. N. Basu	Sys. Programmer	12
5.	Mathematics	O. P. Kapoor	Lecturer	12

CASE WESTERN RESERVE UNIVERSITY

6.	Civil Engg.	M. P. Kapoor	Lecturer	41
7.	Mech. Engg.	S. S. Rao	Assoc. Lecturer	33
8.	Physics	M. M. Kaushik	Sr. Tech. Asstt.	7

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

9.	Physics	T. S. Jaseja	Asstt. Prof.	4
10.	Physics	D. R. Rao	Asstt. Prof.	23
11.	Sociology	P. N. Rastogi	Lecturer	12
12.	Instrumentation	K. Bidhichand	Asstt. W/Shop Supdt.	12
13.	Television	D. V. S. S. N. Murthy	Foreman	7
14.	Glass Blowing	J. N. Sharma	Foreman	6

Sl. No.	Department	Name	Rank	Duration (in months)
15.	Met. Engg.	S. Krishnamurthy	Sr. Tech. Asstt.	6
16.	Physics	R. K. Ray	Asstt. Prof.	12
17.	Elec. Engg.	P. Lal	Foreman	6
18.	Library	M. Chakravarty (Miss)	Asstt. Librarian	7

OHIO STATE UNIVERSITY

19.	Chem. Engg.	S. K. Bhalla	Lecturer	37
20.	Met. Engg.	Ramesh Kumar	Foreman	7
21.	Chem. Engg.	K. Suryanarayana	Sr. Tech. Asstt.	7
22.	Chemistry	V. A. Narayan	Sr. Tech. Asstt.	6

PRINCETON UNIVERSITY

23.	Aero. Engg.	V. V. Nanda	Pilot Ins.	3
24.	Aero. Engg.	R. Krishnamurthy	Foreman	4
25.	English	P. P. Sharma	Asstt. Prof.	12
26.	Academic	P. N. Sharma	Asstt. Registrar	6
27.	Chem. Engg.	S. C. Angirish	Sr. Tech. Asstt.	7

PURDUE UNIVERSITY

28.	Mech. Engg.	C. Sahai	Lecturer	12
29.	Library	M. K. Kelkar	Dy. Librarian	7
30.	Chemistry	P. R. Singh	Lecturer	12
31.	Chemistry	P. C. Nigam	Lecturer	15
32.	Mech. Engg.	J. L. Batra	Lecturer	41
33.	Civil Engg.	K. V. Lakshmidhar	Sr. Tech. Asstt.	6
34.	Chemistry	A. H. Siddiqui	Ana. Chemist	6
35.	Elect. Engg.	L. P. Singh	Asstt. Prof.	6
36.	Workshop	G. C. Das Gupta	Sr. Tech. Asstt.	6

UNIVERSITY OF CALIFORNIA

37.	Civil Engg.	G. D. Agarwal	Lecturer	29
38.	Computer	V. Rajaraman	Asstt. Prof.	11
39.	Mathematics	B. L. Bhatia	Lecturer	12
40.	Computer	S. Kapoor	Sys. Programmer	6

Sl. No.	Department	Name	Rank	Duration (in months)
41.	English	A. C. Pandey	Assoc. Lecturer	11
42.	Chem. Engg.	A. B. L. Agarwal	Lecturer	12
43.	Met. Engg.	M. L. Vaidya	Lecturer	12
44.	Civil Engg.	S. C. Goel	Sr. Tech. Asstt.	7

UNIVERSITY OF MICHIGAN

45.	English	R. K. Bakshi	Assoc. Lecturer	7
46.	Computer	G. P. Gupta	Programmer	12

OTHERS

47.	Psychology	K. K. Singh	Asstt. Prof.	1
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APPENDIX VI

(Ref. 3.14)

INDIAN INSTITUTE OF TECHNOLOGY, KANPUR

U. S. Equipment provided since inception of KIAP Programme of a value of \$ 5000 or more, apiece

S. No.	Item	Price (in Dollars)
1.	Fork Lift Truck	8810.00
2.	Aircraft, Piper	10547.00
3.	Liquid Nitrogen Plant	25206.00
4.	Aircraft Cessna	23085.00
5.	Helium Liquifier System	59580.00
6.	Tape Recorder	5850.00
7.	Glass Working Lathe	59050.00
8.	Engraving Machine	12710.00
9.	Mass Spectrometer	50976.00
10.	Burner with Attachment Flame	6170.00
11.	Pore Volume Analyser	6750.00
12.	Gas Chromatograph	6995.00
13.	Graphite Tube Furnace	7043.00
14.	High Vacuum Resistance Furnace	8150.00
15.	Crystal Furnace	11200.00
16.	Steam Condenser	8212.00
17.	Rotary Filter Press	7510.00
18.	Mass Spectrometer	5872.00
19.	Electron Microscope	12915.00
20.	Vacuum Recording Balance	5139.00
21.	Electron Beam Apparatus	21395.00
22.	High Frequency Induction Furnace	5175.00
23.	Isostatic Press	5400.00
24.	X-ray Diffraction Unit	27395.00
25.	Rolling Mill	10095.00
26.	Electromatic Testing Machine	14950.00

S. No.	Item	Price (in Dollars)
27.	Vibration System	12666.00
28.	Shaker with Accelerometer	10260.00
29.	Shaker with Accelerometer	10260.00
30.	Balancing Stand	5011.00
31.	Vibration Test Equipment	5150.00
32.	Spectrograph	10210.00
33.	High Vacuum Evaporator	9058.00
34.	Analog Computer Transistorised	13890.00
35.	Visicorder	5200.00
36.	Porosimeter	9550.00
37.	Anemometer, Hot Wire	5400.00
38.	Detector Electron	5640.00
39.	Spectrophotometer, Infra Red	34950.00
40.	Spectrophotometer, Infra Red	20550.00
41.	Spectrograph	19310.00
42.	Inter Change Kit-(Eri)	6400.00
43.	Photoelastic Polariscope	5900.00
44.	Laser System	5055.00
45.	Laser System with Power Supply	17875.00
46.	Electrolytic Plotting Tank	5000.00
47.	Grooved Rolls for Cold Rolling	5050.00
48.	Attachment for X-ray Diffraction Equipment	6380.00
49.	Testing Instrument-Instron	10480.00
50.	Compression Testing Machine	10030.00
51.	Pemeability Apparatus	7370.00
52.	Hydraulic Testing Machine	27385.00
53.	Strain Gage Plotter	7760.00
54.	Geodi Meter	13079.00
55.	Dynamotor Set	12870.00
56.	Motor Method Unit-Instructional	8122.00
57.	Impulse Turbine	9507.00
58.	Dynamometer Power Unit	7980.00
59.	Electro Magnet	12500.00
60.	Spectrum Analyzer	8250.00
61.	Spectrometer	9175.00
62.	512-Channel Analyzer	13452.00
63.	Multi Channel Analyzer	8795.00
64.	Capacitance Bridge	8350.00
65.	IBM 1620 Computer Equipment	230320.00
66.	IBM Accounting Machine	50350.00
67.	Honeywell Tape Recorder	9605.00
68.	Analog Computer	15656.00
69.	Analog Computer	15656.00

S. No.	Item	Price (in Dollars)
70.	Gas Turbine Air Compressor	21770.00
71.	Wind Tunnel	30000.00
72.	Wind Tunnel	47000.00
73.	Instructional Wind Tunnel	9000.00
74.	Supersonic Wind Tunnel	10950.00
75.	Portable Hydraulic Open Channel	7610.00
76.	Wind Tunnel	47000.00
77.	Low Beta Detecting System—Manual	7140.00
78.	Van De Graff Accelerator	57300.00

(Ref. 3.15)

INDIAN INSTITUTE OF TECHNOLOGY, KANPUR
OPERATING BUDGET

Fourth Five Year Plan.....Recurring (Non-Plan)

Head of Expenditure	1969-70	1970-71	1971-72	1972-73	1973-74
Pay and Allowances	82.75	86.60	89.50	93.08	96.80
Additional Pay	—	2.00	6.25	6.50	6.76
" "	—	—	2.00	6.25	6.50
" "	—	—	—	2.00	6.25
	82.75	88.60	97.75	107.83	116.31
Scholarship & Fellowship	14.00	14.00	14.00	14.00	14.00
C. P. F.	5.67	6.50	7.50	8.50	9.50
Printing, Stationery, Post & Advertisement	3.75	3.90	4.06	4.20	4.36
Consumable Stores	13.75	14.30	14.87	15.47	16.09
Electric Charges	10.50	11.00	12.00	13.00	14.00
Medical	2.50	3.00	3.25	3.50	3.75
Wages, Petrol oil Etc. Vehicle	3.20	3.30	3.40	3.50	3.60
Conferences, Seminars, Text Book, Liveries, Games	4.10	4.25	4.40	4.57	4.75
Audit fee and other Misc. expenses	0.75	0.50	0.50	0.50	0.50
Joint Entrance Exam. Loans and advances.	1.50	1.50	1.50	1.50	1.50
Local Charges for experts Maintenance	1.10	1.10	1.10	0.60	0.50
Campus School	8.50	9.00	9.50	10.00	10.50
N. C. C. Unit	0.15	0.15	0.16	0.16	0.17
Maintenance of Equipments	0.38	0.40	0.42	0.44	0.45
	4.00	8.00	10.00	12.00	14.00
	73.85	80.90	86.66	91.94	97.67
Grand Total Recurring	156.60	168.96	184.41	199.77	213.98
Less Income	18.00	18.50	19.00	19.50	20.00
	138.60	150.46	165.41	180.27	193.98

APPENDIX VIII
(Ref. 6.2.8.)

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6.2(H)

**Statement showing the assistance received by IIT Kanpur on
the Research Programmes sponsored by outside agencies**

Name of the Deptt.	Year	Name of the Programme	Sponsoring Agency	Total amount received by the Instt. by way of assistance from sponsoring agency. (Rs.)
1. Chemistry	Jan. 72	Spectroscopic and Theoretical studies of hydrogen bonding in molecules of biological interest.	N.I.H.	1,79,200
2. Metallurgical Engg.	1965-66	Electrical behaviour of pure and doped oxides and other ionic solids	N.B.S.	1,65,000
3. Metallurgical Engg.	Aug. 1971	Structure and Properties of Pure and doped ionic solids.	US Air Force	3,42,000
4. Chemistry		Thermodynamic Studies of Metal Oxides, etc.	N.B.S.	1,46,000
5. Physics		A study of selected physical properties of wool fabrics to determine their influence on the mechanical behaviour and morphological structure of the fabric in order to increase utilisation potential for wool.	US Dept. of Agriculture	37,570
6. Chemical Engg.		Kanpur Critical Data Centre	N.B.S.	2,87,280
7. Chemistry		PL-480 Support Scheme ESSA. E-137-67(N)	N.B.S.	2,45,000
8. Chemistry		Phase Transformations in Solids.	N.B.S.	52,500

Name of the Dept.	Year	Name of the Programme	Sponsoring Agency	Total amount received by the Instt. by way of assistance from sponsoring agency. (Rs.)
9. Chemistry	Nov. 69	Infrared Bibliography	N.B.S.	96,750
10. Chemistry	Aug. 71	Electron Transport Properties of Metal Oxides	US Air Force Department	76,000
11. Civil Engg.		Composite Structural Systems in Buildings	N.B.S.	2,40,000
12. Mechanical Engg.		Study of Structural Elements under Dynamic Loading	N.B.S.	1,26,900
13. Physics		Investigation of Magnetic Properties of the Atomic Nuclear and of the Atomic Nuclear environment and the lifetimes of the nuclear states.	N.B.S.	2,24,900
14. Physics		Study of Nuclear Magnetic Relation in Liquids and Solids.	N.B.S.	1,29,200
15. Physics		Optical Spectra of Simple Molecules.	N.B.S.	1,59,410
16. Electrical Engg.		Development of Controller for induction motors.	Metal Box Co. Calcutta	10,000
17. Chemistry	Aug. 72	Magnetic Interactions and Equilibria in Transition Metal Compounds.	C.S.I.R.	15,300
18. Electrical Engg.	Jan. 73	A research programme in remote sensing of the Proposphere by radio troposcattering techniques.	Smithsonian Institute (USA)	1,45,000
19. Civil Engg.	Dec. 72	Project on Prototype dynamic test on Rocket Sled Track.	SSTC, Trivandrum	35,900

APPENDIX IX
(Ref. 5.2)
STATEMENT SHOWING PLACEMENT POSITION OF
I. I. T. KANPUR GRADUATES
AS ON 21ST NOVEMBER, 1972
GRADUATED WITH B. TECH. DEGREE

Year	No. of students graduated in							No. of students employed from the discipline of							No. of students gone for Higher studies in												Status not known								
															INDIA						ABROAD														
	AE	ChE	CE	EE	ME	MetE	Total	AE	ChE	CE	EE	ME	MetE	Total	AE	ChE	CE	EE	ME	MetE	Total	AE	ChE	CE	EE	ME	MetE	Total							
1965	..	8	6	15	23	14	66	..	6	5	10	13	9	43	..	..	..	..	..	..	..	..	2	1	5	10	5	23	..	..	..	..	..	..	..
1966	7	13	12	20	22	11	85	2	10	7	17	16	7	59	..	..	..	..	..	..	..	5	3	5	3	6	4	26	..	..	..	..	..	..	..
1967	9	12	9	18	22	13	83	2	5	6	13	9	7	42	..	..	..	..	..	..	..	7	7	3	5	13	6	41	..	..	..	..	..	..	..
1968	7	28	18	38	44	29	164	4	16	11	21	32	18	102	..	..	3	2	..	4	9	3	12	4	15	1	7	53	..	..	..	..	..	..	..
1969	10	45	21	46	46	29	197	7	31	13	23	26	14	114	1	2	5	5	5	2	20	2	12	3	18	18	10	63	..	..	..	..	..	..	..
1970	12	42	21	72	48	39	234	1	19	9	39	21	20	109	5	8	9	10	4	8	44	6	15	3	16	22	5	67	..	..	..	7	1	6	14
1971	11	59	24	63	57	29	243	4	33	14	33	32	14	130	7	12	7	10	8	7	51	..	10	3	14	12	3	42	..	4	..	6	5	5	20
1972	12	54	13	70	71	32	252	6	20	6	31	37	14	114	1	5	1	15	12	11	45	1	8	1	9	5	5	29	4	21	5	15	17	2	64
Total	68	261	124	342	333	196	1324	26	140	71	187	186	103	713	14	27	25	42	29	32	169	24	69	23	85	98	45	344	4	25	5	28	23	13	98*

GRADUATED WITH M. TECH. DEGREE

1966	..	1	3	9	4	1	18	..	1	3	8	3	1	16	..	..	..	..	..	..	..	..	..	..	1	1	..	2	..	..	..	..	..	..	..
1967	1	3	4	7	1	7	23	..	..	..	7	1	5	13	..	..	..	..	..	..	..	1	3	4	..	..	2	10	..	..	..	..	..	..	..	..
1968	4	9	11	21	17	9	71	3	8	7	11	10	7	46	..	..	..	..	..	..	..	1	..	4	10	7	3	25	..	..	..	..	..	..	..	..
1969	7	13	33	24	30	13	120	7	6	28	17	19	6	83	..	..	..	..	..	..	..	..	7	5	7	11	7	37	..	..	..	..	..	..	..	..
1970	2	10	17	32	20	11	92	2	7	13	27	16	9	74	..	..	..	..	..	..	..	..	3	4	5	4	2	18	..	..	..	..	..	..	..	..
1971	10	20	44	42	40	19	175	7	11	20	32	28	8	105	2	5	10	5	5	3	33	1	3	6	2	3	..	15	..	1	8	3	4	8	24	
1972	2	13	10	39	13	11	88	2	5	6	12	55	4	34	..	4	2	3	7	2	18	..	4	1	2	..	4	11	..	..	1	22	1	1	25	
Total	26	69	122	174	125	71	587	21	38	77	114	82	40	372	2	9	12	8	12	5	48	3	20	24	27	26	18	118	..	1	9	25	5	9	49*	

GRADUATED WITH PH. D. DEGREE IN ENGINEERING

1965	..	..	..	..	1	..	1	..	..	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1966
1967
1968	2	..	1	3	1	..	1	2	1	1
1969	..	1	3	6	1	..	11	..	1	2	6	1	..	10	..	..	..	..	..	..	..	..	..	1	..	..	1	..	..	..	..	..	..	..	..	..	..
1970	..	..	5	..	..	..	5	..	..	5	..	..	..	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1971	2	..	4	9	..	1	16	2	..	3	8	..	1	14	..	..	..	..	..	..	..	..	..	1	1	..	..	2	..	..	..	..	..	..	..	..	..
1972	..	1	1	1	1	2	6	..	1	1	1	..	1	4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	2
Total	2	2	13	18	3	4	42	2	2	11	16	2	3	36	..	..	..	..	..	..	..	..	..	2	2	..	4	..	..	..	..	..	1	1	2	..	

*Placement information in respect of these students is awaited. Many of them have attended the interviews recently and are awaiting the results. It is likely that many of these have taken up jobs but have not responded to our enquiries. Necessary steps are being taken to collect the information for updating the file.

APPENDIX X

(Ref. 8.5)

Dr. M. S. Muthana
Director

1 February, 1973

Dr. S. Bhagavantam
525, Rajamahal Extensions
Bangalore 6

My dear Professor Bhagavantam,

Mr. Sadasivam, Secretary, IIT Kanpur Review Committee, met me Sunday and we discussed all matters connected with developments in the Institute since our last meeting at Kanpur in August 1970. The Fifth Five-Year Plan prepared by the Institute, had been approved by the Board of Governors of our Institute and had been sent to the Ministry of Education. Since certain structural changes have occurred, I would like to give you a brief resume under appropriate heads.

Faculty and Students—The Institute has attained a high degree of maturity to contain post-graduate strength at about 760 during 4th year (1972-73) of the IV Five-Year Plan. We will be reaching post-graduate strength around 800 during final year of the IV Five-Year Plan (1973-74).

Fifth Five-Year Plan has been prepared, approved by the Board of Governors of IIT Kanpur and submitted to the Ministry of Education. The plan envisages reaching a post-graduate strength of 1000 and undergraduate strength around 1250 to 1300. Such a planned growth has been approved by the IIT Council and the Ministry of Education, Government of India. The Institute is rapidly promoting quality improvement programmes to teachers in engineering colleges and other institutions in the country, to personnel in defence services and to those deputed from industries, both public and private sectors. Provision has been made for such intakes. To promote and to accomplish all these and to promote R and D associa-

tion with industries, entrepreneurs and so on, a faculty strength around 406 is envisaged, 116 at the Professor/Associate Professor, 174 at the Assistant Professor and 116 at the Lecturer levels. These numbers have been reached on the presumption of faculty student ratios of 1 : 8 and 1 : 5 at the undergraduate and post-graduate levels. Further an additional faculty number at 15 per cent of the total faculty is programmed for addition to faculty strength to meet the faculty needs for consultancy, industrial project development, curricular development, book-writing, leave vacancies, seconding to other institutions and industries for stated periods et cetera. Support of the Review Committee is solicited.

A number of inter-disciplinary programmes have been developed over the years arising out of the natural interests of the faculty and of their related relevance to education, research and development. Computer Centre, Materials Science Centre and Nuclear Engineering and Science Centre are three such activities. Consolidation and further development in these areas have been planned.

Two more inter-disciplinary and important programmes are planned during the initial phase of the Fifth Five-Year Plan: (i) Design and Development Centre for Engineering Systems (ii) Industrial Engineering, Production Technology and Industrial Management Centre. Computer Centre activities require special mention. One of the major foci of activity at IIT Kanpur has been its Computer Centre. It is very important from the point of continuing the good standards of computing that is already established, to acquire a large system as early as possible. High quality Computer Science programme needs a modern computer to give realistic experience to students and the faculty, to take up work on computer-aided design and project implementation of large engineering systems such as fertilizer and petro-chemical plants, electrical power networks, large civil engineering structures, design of control system et cetera. The soft-ware produced as part of computer activity will be useful in India and outside especially in other developing countries. A committee appointed by the Department of Electronics, Government of India, which had visited Kanpur and other centres in the Northern Region had recommended establishment at IIT Kanpur, Northern Regional Computer Centre. UNDP support for the same was expected. However, it has been indicated in general terms that IIT Kanpur Northern Regional Centre would not get this support. However, IIT Kanpur has been the acknowledged vanguard of Computer Science education in the country. It is very important that the advantages gained by this experience should be strengthened and augmented for national benefit. We have included acquiring of a third generation computer in the first year of the Fifth Five-Year Plan. The support of the Review Committee for the five centres and especially for augmenting the facilities at the Computer Centre is solicited.

BUDGET

Personnel—Pay and Allowances

Four broad categories are given.

Categories	1972-73	Percentage of Total Pay and Allowances	1973-74	Percentage of Total Pay and Allowances
Faculty	47.06	36.26	49.03	34.02
Technical Support Staff	36.04	27.76	43.51	30.19
Administrative Support Staff	23.21	17.87	27.18	18.86
Municipal Services	23.52	18.11	24.41	16.93
Total	129.85			144.13

On the overall basis, faculty salaries and allowances form only 36 percent of the total personnel salary and allowances, which is a very unsatisfactory situation in an educational institution of technology. The Board of Governors of our Institute are also seized with the situation and are examining the position. Review Committee's support in this regard is requested.

Equipments. Equipment deliveries to the Institute almost froze up towards the end of 1970, with the chilling of the Government of India and U. S. A. relationship. Most of the equipments received are about 7 to 10 years old and have become either obsolescent or are reaching a high degree of obsolescence. The GOI and U. S. A. assistance programme formally ended on 30th June, 1972. An after-life assistance programme after the formal ending of the aid, was prepared and submitted to the Government of India from our end and to U. S. A. from the KIAP (Kanpur Indo-American Programme) end. These proposals had envisaged assistance to acquire spare parts and accessories to the equipments provided under the AID programme, for faculty exchange, joint research programmes et cetera. These proposals though shelved for the last two years or so have not been turned at either end, GOI or U. S. A. However, we have made budget provisions under equipment programme under the following categories :

- (i) Maintenance and modification of existing equipments—obsolescence removal
- (ii) Consolidation of activities currently under way for training and research

- (iii) New equipments for projected programmes—developmental programmes for acquiring new equipments, developing new laboratories et cetera. Requirement for high-speed computer has been asked separately. The figures are given in the following tabular form :

Equipment Head	Budget 1972-73 Lakhs	Budget 1973-74 Lakhs	Budget 1974-79 Lakhs (5-year period)
Obsolescence Removal	6.00	6.00	34.814
Consolidation	15.50	16.30	91.570
Developmental	39.09	40.18	240.000
For Computer Centre for CDC 6600 or IBM 370/165 or equivalent system	-/-	-/-	300.000 (during 1974-75)
Library : Books and Journals	7.67	7.75	44.693

The support of the Review Committee for the projected programme is solicited. The Board of Governors has approved the proposals. Support by the Review Committee will strengthen the fund request for programme. This is vital in view of the termination of USAID programme for the Institute.

Physical Facilities : Buildings, institutional and residential

Even for the current programme, there is a shortfall of about 20 percent in the buildings programme. Building programme came to a grinding halt about 4 years ago due to earlier emergencies, China, Pakistan, etc. It is proposed to make good the deficiencies during the coming years. In order to accommodate the proposed growth during the Fifth Five-Year Plan period, plan proposals, as approved by the Board of Governors have been sent to the Ministry. The support of the Review Committee is solicited.

	1972-73 in Lakhs	1973-74 in Lakhs	1974-79 in Lakhs (5-year period)
Physical facilities : Buildings, residential and Institutional	28.656	79.25	146.00

If any further information or clarification is required, we will be very glad to provide the same.

Thanking you,

Yours sincerely,

M. S. Muthana.

