



# TWENTIETH ANNUAL REPORT

INDIAN INSTITUTE OF TECHNOLOGY, MADRAS

1978-79



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**1978 - 79**

**INDIAN INSTITUTE OF TECHNOLOGY, MADRAS**

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*The President of India*

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Ministry of Education and Social Welfare,  
New Delhi.

Sri J. A. Kalyana Krishnan,  
Financial Adviser,  
Government of India,  
Internal Finance Division, New Delhi

Dr. J. D. Sethi,  
Member,  
Planning Commission,  
New Delhi.

***Representatives of the Parliament :***

Sri S. S. Das, M.P.,  
12, North Avenue,  
New Delhi.

Sri G. Bhuvarahan, M. P.  
15-Ferozeshah Road,  
New Delhi.

Dr. Prem Manohar, M.P.,  
16-C, Ferozeshah Road,  
New Delhi

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Secretary,  
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Director - General,  
Indian Council of Agricultural  
Research and Ex-officio Secretary,  
Ministry of Agriculture,  
New Delhi.

Sri Bhaskar Mitter,  
Chairman,  
Calcutta Electric  
Supply Co. Ltd.,  
Victoria House,  
Calcutta - 700 001.

Sri A. L. Mudaliar,  
Chairman, ICI,  
34, Chowringhee Road,  
Calcutta.

Dr. P. K. Iyengar,  
School of Physics,  
BARC, Bombay.

Sri Hiten Bhaya,  
Director,  
Indian Institute of Management,  
Calcutta.

**Secretary :**

Dr. K. Gopalan,  
Deputy Educational Adviser (Tech.),  
Ministry of Education & Social Welfare,  
New Delhi.

**The Board of Governors**

**Chairman :**

Sri A. M. M. Arunachalam,  
Chairman and Managing Director,  
Tube Investments of India Limited,  
11/12, Rajaji Road, Madras - 600 001.

**Nominees of the State Governments :**

Sri M. R. Dharmiah Gowda,  
Director of Technical Education,  
Government of Karnataka,  
Bangalore.

Sri S. Vaiyapuri,  
Director of Technical Education,  
Government of Tamilnadu,  
Madras.

Dr. S. Vasudev,  
Director of Technical Education,  
Government of Kerala,  
Trivandrum.

Prof. T. R. Doss,  
Former Vice-Chancellor,  
J. N. Technological University,  
Hyderabad.

**Nominees of the Council :**

Prof. Gurbaksh Singh, (up to 28-2-79)  
Vice-Chancellor,  
University of Hyderabad,  
Hyderabad.

Vice Admiral N. Krishnan, (up to 28-2-79)  
Chairman & Managing Director,  
Cochin Shipyard Ltd.  
Cochin.

Sri T. Abdul Wahid, (up to 28-2-79)  
Business and Industrialist,  
19, Vepery High Road,  
Madras.

Sri P. S. Banerjee, (up to 28-2-79)  
Executive Director,  
Hindustan Machine Tools Limited,  
Bangalore.

Sri P. Sivalingam, (from 1-3-79)  
Vice-Chancellor,  
Peraringar Anna University of Technology,  
Madras - 600 025.

Sri R. Aravamudan, (from 1-3-79)  
Director,  
Systems Reliability Group,  
Vikram Sarabhai Space Centre,  
Trivandrum - 695 022.

Sri J. J. Mehta, (from 1-3-79)  
Chairman and Managing Director  
Polymers Corporation of Gujarat Ltd.,  
Giriraj Apartments,  
Race Course Circle,  
Opp. GEB Office  
Baroda - 390 007.

Sri A. K. Khader Kutty (from 1-3-79)  
Chairman & Managing Director,  
Western Plywood Co. Ltd.  
Cannanore - 670 010.

**Nominees of the Senate :**

Dr. C. Ramasastry,  
Professor, Dept of Physics,  
I. I. T., Madras.

Dr. P. S. Srinivasan, Professor,  
Dept. of Applied Mechanics,  
I. I. T., Madras.

**Director :**

Prof. R. G. Narayanamurthi, (upto 14-2-79)  
Prof. P. V. Indiresan, (16-4-79)  
I. I. T., Madras.

**Secretary :**

Sri R. S. Virmani,  
Registrar

**The Finance Committee****Chairman :**

Sri A.M.M. Arunachalam,  
Chairman and Managing Director,  
Tube Investments of India Limited,  
'TIAM House'  
Rajaji Road,  
Madras.

**Members :**

Dr. K. Gopalan,  
Deputy Educational Adviser (Tech)  
Ministry of Education  
and Social Welfare,  
Government of India,  
New Delhi.

Sri J. A. Kalyana Krishnan,  
Financial Adviser,  
Internal Finance Division,  
Government of India,  
New Delhi.

Prof. T. R. Doss,  
Former Vice-Chancellor,  
J.N Technological University,  
Hyderabad.

Sri P. Sivalingam,  
Vice-Chancellor,  
Peraringar Anna University of Technology,  
Madras-600 025.

Prof. R.G. Narayanamurthi, (upto 14-2-79)  
Prof. P.V. Indiresan, (from 16-4-79)  
Director, I. I. T., Madras.

**Secretary :**

Sri R.S. Virmani,  
Registrar.



**The Buildings and Works Committee****Chairman :**

Sri A.M.M. Arunachalam,  
Chairman and Managing Director,  
Tube Investments of India Limited,  
'TIAM House',  
Rajaji Road,  
Madras.

**Members :**

Prof. R.G. Narayanamurthi, (upto 14-2-79)  
Prof. P.V. Indiresan, (from 16-4-79)  
Director,  
I. I. T , Madras.

Sri B. Raghupathi,  
Superintending Engineer,  
C.P.W.D., Madras.

Prof. K.S. Sankaran,  
Professor-in-charge,  
Engineering Unit,  
I. I. T., Madras.

Sri P.K. Kandaswamy,  
Chief Engineer,  
P.W.D. Madras

Sri Y.S. Nagaraja Rao,  
Executive Engineer,  
I. I. T., Madras.

**Secretary :**

Sri R. S. Virmani,  
Registrar.

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**The Senate****Chairman :**

Prof. R.G. Narayanamurthi (upto 14-2-79)

Prof. P.V. Indiresan (from 16-4-79)

**Members :**

P. Venkata Rao

E. G. Ramachandran

D. Venkateswarlu

R. K. Gupta

S. D. Nigam

V. S. Nazir Ahmed

B. S. Murthy

C. Ramasastry

S. K. Srinivasan

M. C. Gupta

K. A. V. Pandalai

V. C. Venkatesh

R. Srinivasan

M. Venugopal

V. G. K. Murti

M. K. Achuthan

T. Gopichand

A. K. Srikanth

K. S. Sankaran

J. C. Kuriacose

R. Vasudevan

K. Srinivasaraghavan

V. Srinivasan

T. K. Bose

V. Anantaraman

N. V. Chandrasekhara Swamy

P. Srinivasa Rao

B. V. Aswathanarayana Rao

R. S. Alwar

K. P. Rajappan

G. Aravamudan

C. N. Pillai

P. T. Manoharan

H. N. Mahabala

M. Satyanarayana

H. C. Radhakrishna

D. Johnson Victor

N. R. Rajappa

D. Prithiviraj

Vincent X. Kunukkasseril

G. V. N. Rayudu

S. Jambunathan

M. A. Parameswaran

C. R. Muthukrishnan

S. Ramani

D. K. Banerjee

B. Ramaswamy  
V. Seshadri  
Y. B. G. Varma  
V. M. Krishna Sastry  
L. N. Ramamurthy  
A. Kuppurajulu  
K. Balaraman  
K. A. Damodaran  
C. S. Ballal  
M. V. Krishnamurthy  
S. C. Mitra  
L. V. K. V. Sarma  
K. M. Das  
H. Raman  
K. Thulasiraman

Y. Narayana Rao  
P. R. Krishnaswamy  
V. Radhakrishnan  
H. Chandrasekaran  
R. Natarajan  
V. Ramamurthi  
M. S. Narasimhan  
D. Kakati  
H. Md. Roshan  
P. S. Srinivasan  
V. S. Raju  
C. Ganepathy  
Prof. Klaus Schleusener  
C. K. Narayanaswamy (upto 16-9-78)  
N. Rajagopalan from (17-9 78)

**Nominees of the Chairman**

***Board of Governors :***

G. S. Laddha  
M. Santappa  
C. T. Kurien

***Secretary :***

R. S. Virmani, Registrar

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# **REPORT BY THE DIRECTOR**

*(July 1, 1978 to June 30, 1979)*

The Indian Institute of Technology, Madras, was set up in 1959 as a higher technological Institute of national importance for instruction and research and for the advancement of learning and dissemination of knowledge in various branches of Engineering, Technology, Science and Arts. By an Act of Parliament appropriate organisations were created with necessary powers for the best realisation of these broad objectives. The Institute has completed a span of 20 years of fruitful activity and it can look back with considerable pride and satisfaction on its activities and achievements. By the dedicated efforts of its staff and students, the Institute has secured for itself, in this short span of time, an outstanding position in teaching, research and industrial developmental activities comparable in similar institutions any where in the world.

A brief review of our activities during the year 1978-79 is given in the accompanying pages.

The Institute has on its rolls 1254 post-graduate students and 1229 under-graduate students and has achieved parity between these two classes of students which has been our aim for a long time.

At the last Convocation held on 3rd July 1978, 219 students obtained the B. Tech. Degree; 23 the M.Sc. Degree; 199 the M.Tech. Degree; 21 the D. I. I. T.; 16 the M. S. Degree and 44 the Ph. D. Degree, making up a total of 522. Of the 44 Ph. D. degrees conferred, 28 were in the Engineering discipline.

## **DEPARTMENTS**

### **Courses**

The Department of Humanities and Social Sciences is offering a Part-time Programme of 4 months duration for practising executives in "Materials Management" and "Manufacturing Management". The former course is conducted in collaboration with Indian Association for Materials Management and the latter with Madras Management Association. It is also proposed to offer Ph. D. programmes in English and History from the 1979-80 session. The Department has also

taken steps to establish a 8-booth language laboratory for teaching and learning German.

The Ocean Engineering Centre set up with the assistance of the Ministry of Education and Social Welfare proposes to offer Ph. D. programme in Ocean Engineering from 1979-80 session.

### **Laboratories**

The Television Laboratory in the Department of Electrical Engineering which has been under erection with substantial aid of about DM 2.5 million from the Federal Republic of Germany has been formally inaugurated after important aspects of the erection work were over. Prof. A. Bopp who came as Visiting Professor from the Federal Republic of Germany has left after establishing the basic laboratory facilities in the Television Engineering and also the Post-Graduate Diploma Programme in Television Engineering. The Indo-German collaboration in Television Engineering is still continuing.

### **Conferences / Symposia / Seminars / Summer Schools Short-Term Courses**

Organisation of Seminars, Conferences and Short-term Courses has been one of the main activities in the Departments. These courses include those organised under the Continuing Education Programme and Quality Improvement Programme also.

The Department of Chemistry, in collaboration with the Indian Thermal Analysis Society conducted the First National Symposium on Thermal Analysis from 21st to 23rd December '78. About 80 delegates from all over the country participated and 40 papers were presented in the symposium.

The Industrial Consultancy Centre organised a training programme for Managers (Machinery and Equipment) under the District Industries Centre (D. I. C.) Scheme during August-September 1978. The Programme was sponsored by the Union Ministry of Industries.

### **Testing and Development**

During the year under report, interaction between Industry and the Institute continued unabated.

The Fluid Mechanics Laboratory carried out Wind Tunnel Test on the new Standard 20 Van manufactured by the Standard Motors Products of India, Madras.

The Machine Dynamics Laboratory is planning to conduct detailed dynamic response studies on Indian Rail Vehicles in collaboration with R.D.S.O., Lucknow.

The Bio-Engineering division has been entrusted by the Department of Social Welfare, Government of India with Projects to aid handicapped people.

### **Sponsored Projects**

At present 117 sponsored projects are in progress. The sponsoring agencies include the Department of Science and Technology, Department of Atomic Energy, CSIR, ISRO, and Bharat Heavy Electricals.

So far the Institute has successfully completed 65 projects. In addition to the above, under the IV Indo German Agreement 16 Inter-University Partnership projects have been undertaken by the Institute through its various departments and laboratories. Under this programme, research work is carried out partly in India and partly in Germany. There is provision for mutual exchange of visits by the Faculty incharge of the projects.

The Ocean Engineering Centre has taken up 15 Projects which are in various stages of execution.

### **Awards, Prizes received by Faculty**

The faculty continued to receive honours and prizes for their research and industrial activities. Among these, mention may be made of the prize awarded by the Institution of Engineers to Dr. V. C. Venkatesh for his paper "An Indane activated high velocity hammer" and another received by Dr. D. R. Gopalakrishna Achar, Assistant professor, Department of Metallurgy from D. & H Secheron Electrodes Private Limited, Indore, for his paper "Lamellar tearing susceptibility of heavy walled high strength low alloy (HSLA) steels" presented at the National Welding Seminar.

### **Lectures**

During the year under review, lectures were organised in the Departments of Chemical Engineering and Humanities and Social Sciences by visiting Professors from abroad. Mention may be made of the following :

1. Prof. Dr. A. Fiechter from Swiss Federal Institute of Technology, Zurich,

2. Prof. Dr. A. Holland, Chairman, Department of Chemical Engineering, University of Salford, United Kingdom.
3. Prof. Dr. Ing. A. Brauer, Technical University, Berlin.
4. Professor Dr. H. H. R. Bock. Formerly Visiting Professor at I. I. T., Madras.
5. Prof. Dr. Ing. H. Hammer, Director, Institute of Coal Technology, Technical University, Aachen, West Germany.
6. Prof. M. Denn, University of Delaware.
7. Dr. Martin J. Beckmann, Professor of Operations Research, Brown University, U. S. A.

### **Publications :**

The Journal of Mathematical and Physical Sciences, a research journal, international in character, published by the department of Mathematics continued publication during the year. So far 12 volumes of 58 numbers have been published.

Under the mutual exchange programme of publications initiated by the Department, 68 research Journals are being received in exchange from India as well as from abroad thus saving valuable foreign exchange.

### **Research Centres :**

The Engineering Design Centre has designed and developed an agricultural spraying equipment for the application of Chemicals to the top foliage of fully grown sugarcane crop.

The Materials Science Research Centres (MSRC) is actively collaborating in the area of Materials Science and Solid State Chemistry with Scientists at RRC, Kalpakkam and A. C. College of Technology.

The Workshop and Laboratory of the Fibre Reinforced Plastics Research Centre (F.R.P. Research Centre) has been shifted to the newly constructed Building adjacent to the Aeronautical Engineering workshop. With the financial assistance of about Rs. 1 lakh from the Indian Jute Industries Research Association, the FRP Research Centre has embarked a new research programme on Jute-Polyester composite. Under the Industrial Service Programme, various design, testing and product development consultancy services worth about Rs. 1.00 lakh have been offered by the Centre.

The Regional Sophisticated Instrumentation Centre continues to provide services to users from within the Institute and to scientists from all over the country.

During the year under report one Single Crystal X-ray Diffractometer has been added and orders have been placed for procurement of a Stereoscan Cambridge Scanning Electron Microscope and a Varian E-112 X-Q band Electron Paramagnetic Resonance Spectrometer equipped with wide line NMR accessories.

The Industrial Consultancy Centre (I.C.C.), the first of its kind in a higher technological institution in the country is an industry oriented organisation established to provide access to the facilities in I. I. T., Madras and also follow up the research and other requirements of 'User Industries'. During the year, the ICC took up more than thousand industrial consultancy assignments and the turnover was to the tune of Rs. 22 lakhs.

### **Quality Improvement Programme**

Under the QIP, 247 scholars have been admitted so far from various Engineering Colleges of this country. Currently 16 scholars are working for M.Tech. and 33 for Ph.D. During the year under review, 9 short term courses were conducted for the benefit of teachers of Engineering Colleges.

Under the Invitation Programme of the Institute, two batches of faculty members totalling 10 from various Engineering Colleges have been admitted for 12 to 16 weeks.

Under the Faculty Improvement Programme (FIP) sponsored by the University Grants Commission 30 teachers are working for their Ph.D. degree in the Science Departments.

The Chemical Engineering Education Development Centre has brought out a report on 'Curriculum and syllabi for an eight semester course in Chemical Engineering' and laboratory manual in Fluid Flow Operations.

The Centre proposes to bring out the following publications shortly.

1. Chemtech IV (Synthetic organic products)
2. Food Industries



3. SI Units in Engineering and Science
4. Materials selection and fabrication methods for Chemical process equipment.

The Mechanical Engineering Education Development Centre has published the following Monographs :

1. Mechanical Engineering Education—A bibliography on selected topics
2. Production Process Hand book—Vol. I
3. — do — —Vol. II
4. Teacher Effectiveness

### **Gymkhana**

The winning of the General Championship by the I.I.T. Madras Contingent for the 8th time in succession at the 15th Inter IIT Meet held at Bombay in December, 1978, is an extra-ordinary achievement, because the competition in games were held for the first time on a league basis instead of the traditional knock out basis.

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## DETAILS OF THE REPORT

### I. ADMISSIONS, AWARD OF DEGREES AND PRIZES

#### 1. Student Admissions 1978—79

The number of students and scholars admitted to various courses (1978-79) is given in Table-1.

TABLE 1

**Admissions 1978—79**

Department	B. Tech.	M. Tech.	DIIT	M.Sc.	M.S.	Ph.D.	Total
Aeronautical Engg	11	10	—	—	1	1	23
Applied Mechanics	—	21	—	—	3	2	26
Chemical Engg.	32	39	—	—	9	6	86
Civil Engg.	38	37	—	—	9	7	91
Electrical Engg	59	67	8	—	18	9	161
Industrial Engg	—	18	—	—	1	—	19
Industrial Management	—	17	—	—	5	3	25
Mechanical Engg.	62	72	21	—	8	11	174
Metallurgy	22	27	—	—	5	5	59
Chemistry	—	—	—	20	—	10	30
Mathematics	—	—	—	14	—	5	19
Physics	—	—	—	18	—	7	25
Computer Science	—	25	—	—	1	—	26
Naval Architecture	11	—	—	—	—	—	11
<b>Total</b>	<b>235</b>	<b>333</b>	<b>29</b>	<b>52</b>	<b>60</b>	<b>66</b>	<b>775</b>

The total of 775 includes the following :

Foreign nationals	...	11
Scheduled Castes	...	27
Scheduled Tribes	...	6
Women	...	26
QIP Scholars	...	22
Sponsored candidates	...	20

## 2. Students Strength :

The total strength of students and scholars in the department are given below in the Table 2.

TABLE 2

### Total students strength 1978-79

Department	Under graduate course	Post graduate course	Research	Total
Aeronautical Engineering	52	15	24	91
Applied Mechanics	—	31	50	81
Chemical Engineering	186	58	57	301
Civil Engineering	189	68	61	318
Electrical Engineering	322	116	64	502
Industrial Engineering	—	27	10	37
Industrial Management	—	27	33	60
Mechanical Engineering	353	115	117	585
Metallurgy	108	44	26	178
Chemistry	—	31	64	95
Mathematics	—	25	26	51
Physics	—	32	67	99
Computer Science	—	44	22	66
Naval Architecture	19	—	—	19
<b>Total ...</b>	<b>1229</b>	<b>633</b>	<b>621</b>	<b>2483</b>

The total of 2483 includes the following :

Foreign Nationals	...	99
Scheduled Caste	...	168
Scheduled Tribe	...	20
Women	...	92
QIP scholars	...	49
External registration candidates	...	99
CSIR scholars & sponsored candidates	...	157
Part-time candidates	...	128

### 3. Degrees awarded

The number of degrees awarded at the Fifteenth Convocation of the Institute on July 3, 1978 is given in Table 3. Sri Prataph Chandra Chunder, Union Education Minister, delivered the Convocation address.

TABLE 3  
Number of degrees awarded

Discipline	B. Tech.	M. Tech.	M.Sc.	M.S.	DIIT.	Ph.D.	Total
Aeronautical Engg	8	10	—	1	—	2	21
Bio-Engineering and Applied Mechanics	—	—	—	1	—	2	3
Chemical Engineering	33	24	—	2	—	1	60
Civil Engineering	38	16	—	1	—	5	60
Electrical Engg.	50	41	—	1	5	3	100
Engg. Mechanics	—	3	—	1	—	5	9
Mechanical Engg.	56	46	—	4	16	6	128
Metallurgy	19	12	—	2	—	3	36
Naval Architecture	15	—	—	—	—	—	15
Chemistry	—	—	11	—	—	10	21
Mathematics	—	—	2	—	—	1	3
Physics	—	—	10	—	—	5	15
Computer Science	—	17	—	—	—	—	17
Industrial Engg	—	12	—	—	—	1	13
Industrial Management	—	10	—	3	—	—	13
Maintenance Engg. & Mgt.	—	8	—	—	—	—	8
<b>Total</b>	<b>219</b>	<b>199</b>	<b>23</b>	<b>16</b>	<b>21</b>	<b>44</b>	<b>522</b>

The percentage of First and Second classes is given in Table 4

TABLE 4

Class	B. Tech	M. Tech.	DIIT	M.Sc.
First class with Distinction	17.51%	12.06%	23.81%	4.35%
First Class	41.94%	85.43%	66.67%	78.26%
Second Class	40.55%	2.51%	9.52%	17.39%

With this convocation in July 1978, the number of degrees awarded so far by the Institute is: B. Tech 3547; M.Sc.482, M.Tech. -1694; DIIT-186; M.S.-138; Ph.D.-429 Total 6476.

## Prizes

The names of the academic prize winners for the year are given below :

1. **President of India Prize**  
(For the student of the  
B. Tech degree course with  
the best Academic Record).  
Sri. J. Rangarajan  
B. Tech. —(Mech. Engg.)
2. **Governor's Prize**  
(For all round Proficiency)  
in B. Tech. degree course)  
K. Narayanaswamy  
B. Tech. — (Electrical Engg.  
[Electronics])
3. Merit Prizes for the students with the best academic record in each discipline of each course:

### B. Tech. Course

Aeronautical Engineering	Sri M. Murugappan
Chemical Engineering (Reliance Heat Transfer (P) Ltd., Prize)	Sri Balakotaiah Vemuri
Civil Engineering	Sri Sree Kumar
Electrical Engineering (Power) (Siemens Prize)	Sri K. Kalyan
Electrical Engineering (Electronics) (Philips India Prize)	Kum. S. Indira
Machanical Engineering (Banco Foundation Prize)	Sri J. Rangarajan
Metallurgy	Sri S. Raghavan
Naval Architecture	Sri M. Munichandra Reddy

### M. Tech. Course

Aeronautical Engineering	Sri J. Rajagopal
Chemical Engineering (Prof. B. Sengupto 's Prize)	Sri Nalitham Ramakrishna Venkata Rao
Civil Engineering	Sri G. K. Philip
Computer Science	Sri Karanjit Singh Siyan
Engineering Mechanics	Sri D. Viswanath

Electrical Engineering  
(Siemen's Prize)

Industrial Engineering

Industrial Management

Mechanical Engineering

Maintenance Engineering and  
Management

Metallurgy

Sri S. Anatharamakrishnan  
Memorial Prize (Metal Casting)

Sri Ravindran Sundar

Sri Babu John

Sri R. A. Venkitachalam

Sri B. T. Achyutha

Sri Girdhari Sharan Singh

Sri S. R. Venkatasubramanian

Sri S. Gopalakrishnan

**M.Sc. Courses**

Chemistry

Physics

Sri A. G. Samuelson

Sri Sishri Kumar Nanda

**D. I. I. T.**

Mechanical Engg. (Design)

Electrical Engg. (Television)

Sri C. Ranganathan

Sri L. D'Souza Ronald

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## SPONSORED PROJECTS (1978-79)

### Sponsored Research schemes/Projects

The following 24 projects have been financed by various organisations, Department-wise details are given below. This is in addition to ongoing projects reported in the Annual Report 1978-79.

Sl. No.	Name of the Sponsoring authority	Title of the Project
<b>Applied Mechanics</b>		
1.	A R & D Projects	Improvement to the existing Analytical Capabilities of SAP-IV structural Analysis Programme
<b>Chemical Engineering</b>		
2.	C. S. I. R.	Grinding of Metals by Vibration Mill
3.	I. C. M. R. Project	Microbial Process for production of Vitamin B12 (Cyno cobutamin)
<b>Chemistry</b>		
4.	ISRO Project Department of Space	Polymers useful under Cryogenic conditions (upto 400° F)
5.	Dept. of Science and Technology	Development and evaluation of analytical methodologies related to water pollution.
6.	Department of Science and Technology	Photo induced Catalytic reaction on Semi-conductor oxides (Chemical effects of light)
7.	C. S. I. R.	Hydro sulphurization reaction on Molybdena/alumin/supported oxides of cobalt, Zinc, Nickel and Copper
8.	C. S. I. R.	Selective solvation of ions in mixed solvents
9.	C. S. I. R.	Binding States of Carbon-monoxide
10.	Dept. of Science & Technology	Development of Electric Furnace upto 2200°C based on LnZ <sub>3</sub> (Ln = Rare-earth Z = Cr, Mn, Cr, ceramis)

**Electrical Engineering**

- |  |  |
|--|--|
| 11. Department of Science and Technology | Development of Hardware and software for Computer aided power system data processing and control |
| 12. C. S. I. R.                          | Analysis of Radiation patterns of Reflector Antennas employing SME Techniques                    |
| 13. A. R. & D.                           | Signal Processing Techniques for performance optimization of three Gimbal platforms.             |
| 14. Department of Science and Technology | Identification and preparation of educational material for improvement of Rural Development      |

**Mechanical Engineering**

- |  |  |
|--|--|
| 15. Department of Science and Technology | Solar boosted heat pump systems.   |
| 16. — do —                               | Studies on optional tube bundle configuration for thermal design of fluid bed steam generators |
| 17. C. S. I. R.                          | Effects of Skewed entry boundary layers on secondary flows and losses in a turbine cascade     |
| 18. A. R. & D.                           | Design and Development of the optical Head for T. V. Tractor                                   |
| 19. — do —                               | Design and Development of a Laser Illuminator for Beam Reding Guidance                         |

**Metallurgy**

- |                                    |  |
|------------------------------------|--|
| 20. Dept. of Atomic Energy Physics | Welding of dissimilar metals and alloys used in the nuclear industry |
|------------------------------------|--|

**Physics**

- |                                     |   |
|-------------------------------------|---|
| 21. Dept. of Science and Technology | Development of Optical Modulators           |
| 22. — do —                          | Development of low cost solar grade silicon |
| 23. I. C. M. R.                     | Cryogenic treatment of warts.               |

**Energy Research Centre**

- |   |                             |
|---|-----------------------------|
| 24. Centre of Energy Studies<br>I. I. T., New Delhi | Solar Space Cooling R. & D. |
|---|-----------------------------|



## RESEARCH CENTRES

### ENERGY RESEARCH CENTRE

#### Electrical Energy Division

This division is engaged in developing new techniques for the analysis and control of power systems. The following sponsored research projects are under progress.

1. Development of hardware and software for the computer aided Power Systems Data and Control - Sponsored by Department of Science and Technology, New Delhi.
2. Development of hardware for Load frequency Control of power Systems - Sponsored by Centre of Energy Studies, I. I. T., New Delhi.

The following major I. C. C. Projects have been executed during the year.

1. Computer Programs Development of Load flow solution using Newton Raphson technique- M/s. Tata consulting Engineers, Bombay.
2. Load Forecasting- Tamil Nadu Electricity Board.

#### List of Publications:

1. "Analysis of Transients in load nodes due to large disturbances"- Kuppurajulu, A. Elengovan, S. and Krishnaparandhama, T. Presented at BHEL Second Symposium on Power System Dynamics and Control, held at Hyderabad, 14 - 16, Feb. 1979.
2. "Comparison of stability properties of numerical integration methods for switching surges" - Tripathy, S. C., Rao, N. D. and Elangovan, S. in the IEEE Trans. on PAS- 97 No. 6, Nov/ Dec. 1978, PP. 2318-2326.
3. "Optimal long range hydrothermal energy scheduling" - accepted by IFAC, New Delhi, August 1979- Dr. A. Kuppurajulu, K. Raman Nayar.
4. Minimisation of Losses by Mathematical Programming - H. V. Ramakrishnan, K. Raman Nair, A. Kuppurajulu. Seminar on Power Line Losses conducted by Southern India Power Engineers Federation, Trivandrum on 10- 7- 1979.

## **Solar Energy Division**

The Solar Energy Division has been actively engaged in the research and development of solar thermal devices such as flat plate collectors, concentrators, desalinators, cookers, etc.

The 3-ton open cycle solar dehumidifier - cum - cooker already designed and developed is undergoing further modifications in the light of information already obtained regarding its performance. A continuous absorption refrigerator is being designed based on the experience gained with the intermittent solar refrigerator built earlier. This project is partially supported by the Centre of Energy Studies, IIT, New Delhi.

Information concerning solar energy utilization is being disseminated to industries, research organizations and private users, who approach the Division seeking assistance. Basic solar thermal devices, which are suited to rural applications, such as water heater, air heater (for agricultural drying), desalinator (for producing fresh water) and cooker, were designed and fabricated and supplied to the Engineering College at Karaikudi and another set to the CSIR Regional Complex at Trivandrum. These are intended to be demonstration models and also serve to create awareness in solar energy utilization.

The following new research projects have been initiated:

- (i) Performance analysis of CPC solar devices
- (ii) Analysis of flat plate collectors augmented by mirror boosters.

### **List of Publications / Papers Presented:**

1. Transient Response of a Solar Regenerator — P. Gandhidasan, V. Sriramulu, M. C. Gupta, 'Applied Scientific Research', 34 (2-3), 1978.
2. Buoyancy Effects in a Solar Regenerator — P. Gandhidasan, V. Sriramulu, M. C. Gupta, "Solar Energy", Vol. 22, 1979, pp. 9-14.
3. Theoretical and Experimental Investigations of a Countercurrent Solar Regenerator — P. Gandhidasan, V. Sriramulu, M. C. Gupta "1979 International Solar Energy Congress", Atlanta, Georgia, USA, May 28 — June 1, 1979.
4. Theoretical and Experimental Investigation of an Intermittent Solar Refrigerator — A. Venkatesh, V. Sriramulu, M. C. Gupta, Ibid.

## **Wind Energy Division**

In continuation of its activities in the testing of a 1 kw Vertical Axis wind machine in collaboration with BHEL, R & D, Hyderabad under the auspices of the Department of Science and Technology, the Division installed the second proto-type in Kalpakkam and monitoring under field conditions is expected to begin shortly. Concurrently, wind tunnel tests have been carried out to study the braking effects of a flap-type arrangement under high wind conditions. A separate model with stationary shaft and rotating blades is under construction for torque studies.

## **ENGINEERING DESIGN CENTRE**

### **Objectives**

The Engineering Design Centre has been set up to undertake design and development projects of multidisciplinary character referred to the Institute by various industries and national organisations.

### **Projects completed**

The Centre has successfully completed the design and development of Special High-Reach Spraying Equipment for sugarcane fields. The project was referred by M/s. Monsanto Chemicals of India Ltd., Bombay. First of its kind, it is of knapsack motorised type incorporating a hydraulic rotary positive displacement pump discharging 5 litres/min at 4 kg/c.m.<sup>2</sup> The equipment can also be used for other tall crops such as mango, plaintain, cashew etc.

### **Projects in progress**

1. Design and Development of Photogrammetric Camera: Lab A model of the camera is being designed. The projects has been referred by D. S. T.
2. Design and Development of Multi - Spectral Camera: Lab A model has been designed and is being tested. The design of the computer control, including its software, is nearing completion.
3. Study on thin films by chemical vapour deposition in a glow discharge ambient is in progress. The project has been referred by D. S. T.
4. Design and development of 300 mm Hydraulic Power Hacksaw Machine: The project has been referred by TANSI

Machine Tools, Ranipet, Tamilnadu. All the working drawings have been handed over to the firm and the prototype is under fabrication.

5. Design and Development of Diving suits for Sewerage workers. The design of the suit is in progress. The suit will enable the workers to work with safety in sewer lines. The Madras Metropolitan Water Supply and Sewerage Board is showing keen interest in the project.
6. Design and Development of swimming Flume for training of Swimmers. The design of a swimming flume measuring 3m long x 2.5m wide x 1.3m deep is in progress. Water is made to flow at different velocities in the flume. Since the swimmer will be swimming against the flow of water, he will be swimming at a stationary position and thus the coach can observe the performance and give him proper coaching. The flume will be a boon to swimming coaches and Swimming Federations are showing interest in the project.

## **FIBRE REINFORCED PLASTICS RESEARCH CENTRE**

### **Academic Programme**

The post - graduate course Ch.E 724 composite Materials has been offered by the faculty of the centre. Two Ph.D. thesis projects continued during the year.

### **Continuing Education Programme**

The following short courses have been offered by the Centre during the year.

- |   |               |
|---|---------------|
| 1. Short Course on FRP Technology<br>One week duration                              | October 1978  |
| 2. Workshop training on Fibre Reinforced Plastics<br>One month duration             | November 1978 |
| 3. Design of Chemical Equipment with Fibre Reinforced Plastics<br>One week duration | February 1979 |

A total of 85 participants attended the three courses. The faculty have also delivered lectures in the HAL Management and Process Engineers Courses and in the Short Course on Ship Structures.

### Research and Development

The R and D studies on jute fibre reinforced polyester, Fibre reinforced thermoplastics, and glass fibre reinforced plastics have been continued during the year.

A chopped strand mat making machine and a pre prag making machine, both required for processing of glass fibre and FRP were under fabrication.

The new products including a modular type full scale house of 20sqm plinth area in glass/jute reinforced polyester have been developed by the Centre.

### Industrial Consultancy

The Centre has undertaken about 18 Industrial Consultancy projects for a total of about Rs. 1.0 lakh. Apart from this the Centre has offered technical help and advice to a number of small industrial concerns and entrepreneurs.

## MATERIALS SCIENCE RESEARCH CENTRE

Title	Conference
A new series of complex perovskite oxides of the type $\text{LnB}_{0.75}\text{B}_{0.25}\text{O}_3$	Presented at 'National Symposium on Structure, Bonding and Reactivity of Inorg. Compounds' I. I. Sc., Bangalore, Oct., 1978.
Synthesis and properties of new copper chalcogenide spinels, $\text{CuM}_2\text{Ch}_4$	Paper presented at 'Nuclear and Solid State Physics Symposium' I. I. T., Bombay, Dec., 1978.
Positron Annihilation in pure and EDA intercalated $\text{NbSe}_2$	Paper presented at 'National Symposium on Positron Annihilation', University of Delhi, Apr., 1979.

### Research and Development

Research Publications :

Papers : 8

### Departmental Projects

1. Electrolyte Solar Cells based on semiconductor electrodes for light-to-electricity conversion.
2. Studies on oxide bronzes in TI-Mo, TI-V systems.
3. Synthesis of  $\text{CrO}_2$  for magnetic tape applications.
4. Fibre and cloth-type glass formulation.

**Assistance to Industry**

1. Interpretation of X-ray structure data for CECRI, Karaikudi.
2. Interpretation of thermograms for BHEL, Bhopal.
3. Magnetic susceptibility data to IDL Ltd., Hyderabad.

**New Major Equipments Added**

1. Motwane Milliohm meter.
2. 4" Electromagnet with power supply.
3. Keithley 155 DC Microvolt meter.
4. 5 digit semimicro balance.
5. Conductivity bridges (Elico).
6. Liquid Nitrogen dewars (MVE, USA).
7. pH meters (Elico).
8. Stereo Zoom microscope (Bausch & Lomb, USA).
9. Thermopile (Eppley, USA).

**Equipments Fabricated**

1. Four probe resistivity apparatus for measurements on single crystals and pellets of metallic and semiconductor materials (range 300-1000K).
2. Electrolyte photocell set up for solar energy conversion.
3. Hall effect apparatus (range 77-300K; in the final stages of fabrication).

**Visitors to the Department**

1. Professor D. Chakravorty, Head, Advanced Centre for Materials Science, IIT, Kanpur.
2. Professor F. Jellinek, Professor of Inorganic Chemistry and Materials Science and Dean, University of Groningen, The Netherlands.

**Invited Lectures Delivered by the Staff**

Professor G. Aravamudan delivered 3 invited talks at Madurai University, 3 talks at REC, Trichy and 1 at University of Madras.

Dr. G. V. Subba Rao delivered two invited talks at "Winter School on Solid State Chemistry", IISC., Bangalore.

### **R & D Programmes likely to come up in the near future**

1. Electronic and electro-ceramic materials for solid state devices, heating elements, electro-optics and pressure transducers.
2. Superionic conductors for solid-state high energy density batteries.
3. Selective ceramic and bond coatings for protection of high temperature alloys.
4. Uni-dimensional chain type conductors.

### **Collaborative Efforts :**

Close collaboration in various research projects of mutual interest and national importance has been undertaken between Materials Science Research Centre, I. I. T. Madras and Advanced Centre for Materials Science, I. I. T. Kanpur, A. C. College of Technology, Madras University, Physics Dept., Materials Science and Chemistry Divisions, Reactor Research Centre, Kalpakkam, I.I.Sc., Bangalore and BARC, Bombay.

## **THE REGIONAL SOPHISTICATED INSTRUMENTATION CENTRE**

This Centre sponsored by the Department of Science and Technology houses sophisticated spectroscopic equipments dealing with almost all the regions of spectroscopy. It has been providing spectroscopic services to users from within the IIT and outside. Last year attachment training programmes were conducted for several scientists in the maintenance and operation of spectroscopic equipment. Apart from providing facilities to the scientists from various National Laboratories and Academic Institutes, analytical services and consultancy were also provided to various chemical industries. Services and research facilities will soon become available on three more sophisticated equipment which include Single Crystal X-ray Diffractometer, Scanning Electron Microscope and X/Q-band EPR and wide line NMR spectrometer. The table below lists the number of measurements provided during the year 1978-79 on various spectrometers: (From 1-7-1978 to 30-6-1979)

Spectrometer	No. of spectral measurements	
	IIT/MADRAS	EXTERNAL
XL 100	829	377
A60D	41	15
EPR	3030	490
FIR 30	59	174
IR 12	9	14
PE 257	1557	928
DMR 21	544	348
Aminco Bowman	204	5
AA6D	14	79
ORD	—	18

Prof. P. T. Manoharan went on a Visiting Professorship at the Katholieke Universitat, Nijmegen. Dr. Surjit Singh and Dr. S. Subramanian have been awarded Alexander von Humboldt Fellowship to carry out advanced research on spectroscopy and will be availing the fellowships in 1979-80.

### INDUSTRIAL CONSULTANCY CENTRE

The Industrial Consultancy Centre (ICC) was started in this Institute in 1973 although consultancy activities were in progress in a modest way from the early sixties. As a link between the Institute and the Industry, it aims to encourage and promote consultancy work by the faculty and serve as a catalyst in the discharge of these tasks. The Centre has the active support from the Government of Federal Republic of Germany and had the benefit of the services of a German Adviser, Dr. Hans Wagner, till September 1978. The Centre brings about the transfer of know-how from the Institute — comprising more than 300 teaching/research staff members, 60 laboratories and research centres, well-equipped workshops, Computer Centre, etc. — to the industry.

Since its inception, the ICC has undertaken over 5000 assignments for over 1000 customers covering a wide range of activities in several fields of engineering and science.

During the year 1978-79, the ICC has taken up nearly 1000 assignments and the turnover was to the tune of Rs. 22 lakhs. In about six



years since the ICC was established, more than a five-fold increase in turnover has been recorded.

Following are some of the important events during the period 1978-79;

### **Special Courses**

At the instance of the Ministry of Industry, Government of India, ICC organised a two-week course on Machinery & Equipment for Functional Managers of District Industries Centres from 21st August 78 to 2nd September 78. Participants numbering 29 from the States of Southern Region viz. Andhra Pradesh, Karnataka, Tamil Nadu and Pondicherry as well as from Bihar, Manipur and Jammu & Kashmir attended the course. Lectures were delivered by the Institute Faculty and also by experts from major industries like HMT, Ashok Leyland, Voltas, etc. Certificates were awarded to the participants.

### **Industrial & Research Projects**

Important industrial and research projects undertaken by the Design wing of the ICC during the period under review are :

1) Design and development of an agricultural spraying equipment for M/s Monsanto Chemicals of India Ltd., Bombay for the application of Chemical ripeners on to the top foliage of sugarcane crops. This design is the first of its kind in the country incorporating a hydraulic rotary pump capable of delivering 5 litres / min at 4 bar with a swath width range of 10 metres.

### **Study and synthesis of thin films by CVD in a Glow discharge ambient**

2) This is an interdisciplinary project sponsored by the Department of Science and Technology. The study would open up new possibilities to synthesise high refractory and hard materials as coatings, part from amorphous silicon which has proved a highly effective material for photo-voltaic conversion of solar energy.

### **Awards**

Dr. V. C. Venkatesh, Professor-in-charge, ICC, was awarded a cash prize by the Institution of Engineers (India) during its annual session held on 6th Jan. '79 at Bangalore, for a best paper entitled "Indane Actuated High Velocity Hammer".

### **Seminars conducted**

With the idea of creating patent awareness among the Institute Faculty and Scientific world in the South, a Seminar was conducted by ICC. Papers were presented by a number of specialists in the field.

### **New Programmes**

The Centre endeavours to promote consultancy work in the areas of industrial research, design, development and innovation rather than the less sophisticated areas of fabrication, calibration, etc.

### **Other special activities**

**Release of New ICC Folder and Photographs:** In the wake of its efforts to give a fillip to Public Relations work, ICC had undertaken photographing of the various industrial consultancy activities and to bring out a new ICC folder entitled 'A Glimpse and how the Technological Resources of IIT Madras can be Utilised', tailor-made to suit the needs of individual laboratories so as to enable them to portray the kind of services they can render to the clients, present as well as prospective, from the industry.

## **INDO-GERMAN COLLABORATION**

Under IV Indo-German agreement, nine projects in the first Phase have been completed and seven projects in the second phase are in progress.

### **Completed**

1. Design and development of multistage fluidised bed reactor.
2. Development of pretensioned pre-stressed concrete railway sleeper for the Indian Railways.
3. Development of high-speed digital link.
4. Heat transfer studies in electrical machines.
5. Speed-control of a squirrel-cage induction motor.
6. Centrifugal Compressors.
7. Improvement of weld quality in wheels.
8. Preparation and investigation of magnetic properties of ferromagnetic materials of technical interest,
9. Design and construction of cryogenic equipment.

**In progress**

1. Study of the formation and movement of the Saltwater interface near Madras Coast leading to possible pollution of aquifers.
2. Systems approach to Engineering Design structural systems.
3. Development of Precast elements for Housing.
4. Microwave communication systems.
5. Development of alternate fuel for I. C. Engines.
6. Development of Precision, glass scales.
7. Utilisation of Solar Energy for Cold Storage of Food Products.

**FRENCH COLLABORATION**

Prof. K. Balaraman, visited Aerospatiale, Toulouse, France, for a period of about six months.

Dr. S. Krishnan continued his stay at Poitiers, France.

Dr. A. K. Sreekanth and Mr. Job Kurian visited University of Marseille, Marseille for a period of about two months.

Dr. Louis Pau of ENSAE, France visited the Department for one week and gave a series of lectures on Reliability Engineering applied to Aerospace Equipments.

**CONTINUING EDUCATION PROGRAMME**

The Continuing Education Programmes are intended to establish closer association with practising members of the profession under which in-service refresher courses for scientists, engineers and technologists engaged in industry and other scientific and technical organisations are offered under two broad categories, viz. Short Term (2 week duration) and Long Term (longer duration) courses.

During the period July 1978 to July 1979 about 10 short term courses and 6 long term courses were organised.

**QUALITY IMPROVEMENT PROGRAMME****Serving Teachers Programmes**

The number of teachers of Engineering Colleges admitted during the year is 7 for M.Tech. and 17 for Ph.D. programmes. This brings the number of QIP Scholars on rolls in 1978-79 session to 54.

### Short Term Courses

1. Analysis of design of bridge structures  
(23 participants in summer '78)
2. Dynamic behaviour of offshore structures  
(31 participants in summer '78)
3. System theory and its applications  
(13 participants in summer '78)
4. Advances in materials processing  
(16 participants in summer '78)
5. High Vacuum science and technology  
(16 participants in Summer '78)
6. Dynamics of structures  
(13 participants in winter '78)
7. Design of heat transfer equipment  
(17 participants in winter '78)
8. Microwave communication systems  
(5 participants in winter '78)
9. Teacher effectiveness  
(20 participants in winter '78)

### IMPORTANT LECTURES AND SEMINARS

Sri C. R. Subramaniam, Chairman, & Managing Director, Bharat Electronics, Ltd., Bangalore, delivered the Philips Endowment Lecture on Commercial and Technical aspects of Integrated Circuits, Developments and Production on 3rd October, 1978.

Dr. S. Chandrasekhar (formerly Union Minister and Vice-Chancellor, Annamalai University) delivered A. L. Mudaliar Memorial Lecture on India's Population Crisis and Contraceptive Technology, on 23rd November, 1978.

### STAFF

3 Assistant Professors ; 1 Lecturer ; 3 Senior Technical Assistants have joined during the year. Total academic staff strength - 345 and non-academic staff strength - 1367. The total number of Institute employees including the work-charged staff - 2129.

### INSTITUTE GYMKHANA

Under the able guidance of Prof. V. Anantharaman, Professor in-charge of both Student Affairs and the Institute Gymkhana and the General Secretary Mr. S. Geneindran along with his dedicated Steering Committee members, the Gymkhana made tremendous strides in all spheres of its activity.

## **Sports and Games**

I. I. T., Madras retained the coveted General Championship in the XV Inter I. I. T., Meet held at Bombay in December 1978, for the 8th time in succession. The credit goes to all our athletes, the captains of various teams and its members. It won as many as 12 golds, 9 silver and the trophies in Hockey, Tennis, Volleyball, Basket Ball and Athletics.

In the Inter Collegiate Competitions conducted by the Madras Collegiate Athletic Association, I. I. T., Madras did very well. It managed to be in the top position amongst the first division teams. In the city open tournaments such as Stanley Medical College tournament, Betram Tournament conducted by Loyola, tournament conducted by YMCA and New College, I. I. T., Madras was rated equal to the top 'Class Teams'.

In the Inter Engineering Meet held at Warangal in March 1979, I. I. T., Madras bagged 6 golds, 2 silver, 3 bronzes and 2 rolling trophies.

The Institute Chess player Mr. N. Ramesh was adjudged the National Junior Champion for 1978. He represented Tamil Nadu in the National.

For the first time, the Gymkhana conducted a Flood-Lit Basket Ball tournament for Women at Open Air Theatre for Kokila Rajaiah Trophy and for men for Gerhard Fischer Challenge Cup, where there was keen participation from the local collegiate teams.

The Gymkhana also conducted an Open Bridge Tournament in which I. I. T., participants acquitted themselves very creditably.

## **Cultural and Literary Activities**

In the sphere of literary activities I. I. T. surpassed everything they had achieved in earlier years. The I. I. T. debaters bagged as many as 23 first places in contests held all over India.

The I. I. T. Quiz team was a close follower with a big harvest of the 1st and 2nd prizes. The Institute Fine Arts team did extremely well to be the recipient of many first places both in and outside Madras.

The I. I. T. Musical talent was seen with its entire contingent when it was sent outside Madras for the first time and won trophies in Trichy and Delhi. Apart from these, the Gymkhana this year has started a Centre for Arts and Crafts.

The Swimming Pool was brought under the auspicious of the Institute Gymkhana and many top class Swimmers are lately seen in the Pool.

The Gymkhana also provides facilities for Skating, Riding and Yatching.

### **N. C. C. and N. S. S.**

During the academic year 1978-79, 100 students of First Year B.Tech. class were enrolled in N. C. C. The total strength of cadets was 200 at the beginning of the training session.

8 cadets attended the All India Vayu Sainyak Camp held at Dodballapoor near Bangalore from 11th to 24th June 1979. Two cadets and one Part-time N. C. C. Officer Ft. Lt. V. Subramaniam attended the Air Force Attachment Camp at Chandigarh from 18th June to 14th July 1979.

261 students including 15 women students were enrolled during the year in NSS. Apart from the continuation of the multi-purpose activities in the adopted villages of Narayanapuram and Pallikaranai, educational activities in two other villages near the Institute, namely Velachery and Taramani were intensified. The response from the School children was excellent. Two special camps were held, one in "Youth for Rural Reconstruction" and the other in "Youth for Welfare of Children and Youth for Farm Irrigation."

## **CENTRE FOR RURAL DEVELOPMENT**

### **Objectives**

It is imperative that the intrinsic and effective development of a country has to start from below, i. e., from the village level up. This alone can be the proper direction of development since about 70 percent of the people of our land live in the rural sector.

Experience of the past has shown that Economic Development must at least run parallel to General Social Development. It can even be said that Economic Development may as well precede social development. It is with this philosophy in mind that the Institute started a CENTRE FOR RURAL DEVELOPMENT (CRD) two years back. The emphasis is on transfer of Appropriate Technology available already in a large measure at the Institute to the villages to generate immediate employment for the villagers by making use of available raw materials and their proper

management. An Energy Complex combining Bio-gas, Solar energy and Wind power is being set up near the village along with appropriate water management, in the 94 acre low lying land allotted to the Institute by the Tamil Nadu Government. The work will be carried out with the active participation of the National Service Scheme Volunteers with a strength of 30 students and the several departments of the Institute in close co-ordination in appropriate Inter-disciplinary projects.

### **Present activities**

The following has been accomplished mostly as a beginning of the building up of the infrastructure for the Technology Complex :

- (a) Reclamation of 2 acres of land by the boundary canals-Inside Level Raising System for construction of temporary sheds for Dairy Farm, Store Rooms, N. S. S. shed and Carpentry unit.
- (b) Reclamation of 10 acres of land by Bunding System for Horticultural Operations and Fodder Farm.
- (c) Reclamation of 40' diameter well
- (d) Barbed Wire Fencing of (a) & (b)
- (e) Small Fish Farm
- (f) Planting of 2000 palmseeds
- (g) 500 Miscellaneous Trees Planted
- (h) Small Pumped up Earthen Water Reservoir
- (i) Soil reclamation of 2 acres of land under (b) by application of Gypsum for Fodder Farm
- (j) 10000 c. ft. horizontal type of Gobar Gas Plant
- (k) 2000 ft. of W. B. M. road laid
- (l) Dairy Farm with 20 heads of milch animals started with loan to villagers from State Bank India, Tambaram and Managed by CRD for the Central Supplies unit, IIT Hostels
- (m) Carpentry unit under grant from COSTED and in collaboration with Non-Formal Education Association, Madras
- (n) Pump house for Gobar Gas Technology Model erected
- (o) Small solar energy distilled water plant set up.
- (p) Medical care for villagers (O. P. Treatment)

- (q) Improvements in the Primary School
- (r) Border Bund to ward off excess flood water under construction
- (s) Border Fencing with Barbed wire under construction

### **CONSTRUCTION OF BUILDINGS**

The following are some of the important buildings which are in progress or were completed during the course of the year.

#### **List of works completed**

1. Construction of Ocean Engg. Centre
2. Construction of a building for Rarefied gas dynamics
3. Construction of building for Rocket and Missiles Laboratory
4. Construction of a building for F. R. P. Research Centre
5. Construction of First floor of Vanavani High School
6. Construction of Nursery School Building
7. Half block of Married Officers Hostel

#### **Work in progress**

1. Construction of Hostel No. 11
2. Extension to Taramani House
3. Extension to Sarayu Hostel
4. Construction of D-Type Quarters 2 blocks
5. Construction of Married Officers Hostel half block
6. Construction of Married officers Hostel 1 block
7. Over-head Reservoir 1,50,000 Gls.
8. Enquiry Office
9. Extension to ME & MH Lab.
10. Construction of Thermal Turbo Machine Lab.
11. Construction of E Type Quarters 2 blocks
12. Construction of E1-Type Quarters 1 block



## **AERONAUTICAL ENGINEERING**

### **Research and Development**

#### **Research Publications**

- (a) Papers in Journals : 13
- (b) Papers presented at Conferences : 2
- (c) Books / Monographs :
  1. T. K. Bose and S. Santakumar — Theoretical Gas Dynamics by Zierep. J. — English Translation, Springer Verlag 1978.
  2. T. K. Bose — High Temperature Gas Dynamics, Macmillan 1979.

#### **Consultancy work**

1. Testing of hydraulic arm ram for MF 1035 Tractor for Tractors and Farm Equipments, Madras.
2. Design of Arc Jet Facilities for VSSC Trivandrum

#### **Indo-French Collaborative Programme**

Prof. K. Balaraman visited Aerospatiale, Toulouse, France, for a period of about six months.

Dr. S. Krishnan continued his stay at Poitiers, France.

Dr. A. K. Sreekanth and Mr. Job Kurian visited University of Marseille, Marseille for a period of about two months.

Dr. Louis Pau of ENSAE, France visited the Department for one week and gave a series of lectures on Reliability Engineering applied to Aerospace Equipments.

#### **Additional Space / Laboratory**

1. Extension to the Gas Dynamics Laboratory to house the Rarefied Gas Dynamics Facility.
2. Three sheds for liquid / solid propellant research work.

#### **Major Equipments Added**

1. Air Compressor
2. Air Drier
3. Pressure Vessels

### **Important Visitors to the Department**

1. Prof. A. D. Young, Queen's Mary College, London, U. K.
2. Prof. J. J. Spillman, Cranfield Institute of Technology, Cranfield U. K.
3. Dr. A. Das, DEVL, Braunschweig, West Germany
4. Dr. D. Hittner, French Embassy, New Delhi.
5. Dr. N. R. Subramanian, National Aeronautical Lab., Bangalore.

### **New Developmental Program Undertaken**

Design and Development of a 1 m x 0.7 low speed wind tunnel.

### **Invited Lectures Delivered by the Departmental Staff**

1. Turbulent Boundary Layers — QIP  
Short Term Course on Design of  
Heat Transfer Equipment — Dr. T. K. Bose
2. Out of plane Moire Methods ISTE  
Short Term Course on Optical  
Methods of Measurements in  
Engineering — Dr. G. Subramanian
3. Application of Laser Technology to  
Aerodynamic Flow Visualization ISTE  
Short Term Course on Optical Methods  
of Measurements in Engineering — Dr. A. K. Sreekanth
4. On certain approximate methods in  
structural dynamics - QIP Short Term  
course on Dynamics of Structures — Dr. G. Subramanian
5. Introduction to Non-linear Analysis  
QIP Short Term Course on Dynamics  
of Structures — Dr. T. K. Varadan
6. Matrix Stability Analysis of Structures-  
Continuum Education Short Term  
Course on Matrix Computer Methods  
in Structural Analysis. — Dr. G. Subramanian
7. Finite Element Methods to Field  
Problems - Continuum Education Short  
Term Course on 'Computer Aided  
Design' — Dr. G. Subramanian

## APPLIED MECHANICS

### Short Term courses conducted

1. Two weeks Winter School in Dynamics of Structures.
2. One week course on case studies in Tribology for Engineers from BHEL.

### Important lectures and Seminars

1. Dr. Subrata Saha, Yale University, U.S.A.
2. Dr. S. Srinivasan, Biophysics, B.H.U. Varanasi.
3. Mr. Palaniappan, Case Western University, U.S.A.
4. Dr. Jayanthi Rama Rao, Vijaya Hospital, Madras.
5. Dr. Herbert Uberall, Professor of Physics, The Catholic University of America, Washington.

### Research and Development

Number of Publications :	International	—	36
	National	—	6

### Sponsored Research Schemes and Projects

1. Department of Social Welfare :
  - (a) Aids to promote functional electrical stimulation.
  - (b) Ultrasonic mobility aid for the blind
  - (c) Assessment of leprotic feet and individualized foot-wear design.
2. DST—BHEL—IIT Project on the development of vertical axis wind machines.
3. DST Project on wind effects on low-rise buildings.

### Assistance to industry - ICC

1. Report on the failure of milk tanks of Tamil Nadu Dairy Development Corporation, Madras
2. Structural design of reaction kettles, Rane Brake Linings, Ltd., Madras
3. Calibration of a 20 mm orifice, as per Indian standard 5538 Pt. II 1972 for measurement of air delivered by Compressors.

4. Wind tunnel tests to determine Drag and stability characteristics of new standard 20 van.
5. Performance characteristics of stockbridge dampers for various industries.
6. Fatigue tests on stockbridge dampers for Best and Crompton Engg., Madras.
7. Noise level measurements for Mico, Madras; Southern Railway, Madras.
8. Vibration analysis of pipe line networks for SPIC, Tuticorin.
9. Dynamic tests on insulators for W. S. Insulators, Madras.
10. Retainer consultancy, K. C. P. Ltd., Madras.
11. Retainer consultancy, BHEL., Trichy.

#### **Equipment fabricated**

1. Equipment for laser transmission studies
2. Tissue characterization
3. EEG narrow band fitters.
4. Stimulations for event related potentials.
5. Magnetic loading device for photoelastic bench.
6. Flow visualisation tank
7. Mechanical vibrator
8. Dynamic balancing machine
9. Gearbox for multi-speed drag infusion pump.

#### **Invited lectures by staff**

1. Dr. Megha Singh in Summer school in Bio-Medical Engineering, Trivandrum.
2. Dr. T. M. Srinivasan at Trivandrum, Warangal, Osmania, Madurai and COSTED Conference at Madras.
3. Mr. S. Radhakrishnan in Summer School in Bio-Medical Engg, Trivandrum.
4. Dr. S. Venkatesan and Dr. J. Ramachandran at BHEL, Trichy
5. Dr. V. Ramjee and Dr. N. V. C. Swamy at M. I. T., Madras.
6. Dr. V. Ramamurti, Dr. N. Ganesan and Dr. B. S. Prabhu at National Productivity Council, Madras; University of Madras.
7. Mr. S. Swarnamani at National Productivity Council, Madras

### Special honours and distinctions conferred

Dr. T. M. Srinivasan was invited as Director, Yoga Research Institute, Tirupati, for one year till Sept. 1978.

### New Equipments

1. EEG phase coherence monitor
2. Systolic time interval monitor
3. Alpha counter
4. Digital multimeters
5. 2 m W laser
6. Precision coordinate drilling machine
7. Multipurpose second operation lathe

## CHEMICAL ENGINEERING

### Quality Improvement Programme / UGC Teacher Fellowship Programme

(a) Serving Teachers Programme :

No. trained so far for M. Tech. ... 5

No. on rolls in Ph. D. (QIP) ... 2

### Important Lectures and Seminars

Seminar on University-Industry Collaboration conducted jointly with I. I. Ch. E. in July 1979.

### Research and Development

(1) Research Publications :

(a) Papers: Total number published in Journals ... 23

(b) Books / Monograms.

Title : 'CHEMTECH IV' (Manual of Chemical Technology, Vol. IV) Natural Organic Products.

Authors : Dr. D. Venkateswarlu et al.

Publisher : Chemical Engineering Education Development Centre.

Year : 1978

## (2) Sponsored Research Schemes and Projects :

Thermal instabilities in flow boiling loop - DAE Scheme.

Multistage fluidisation investigation in cold model. C. S. I. R  
Studies in Fluid Energy Grinding. Grinding of Metals by  
Vibration Mill C. S. I. R.

Studies on reciprocating gas-liquid contractor — C. S. I. R.

**Assistance to Industry**

Agency	Project
1. M/s. Auroville Electronics, Pondichery.	Use of spray drying facilities
2. Regional Research Laboratory Hyderabad.	Concentration of pesticides using thin film equipment.
3. M/s. Binny Ltd., Madras.	Rotary drying of beach sand concentrate.
4. M/s. Nilakantan and Brothers, Madras.	Testing of neoprene discs used for making bearings.
5. Director-General of Supplies and Disposals, Madras.	Testing of neoprene discs.
6. Eimco-K. C. P. Ltd., Madras.	Feasibility studies on the treatment of effluents.
7. Larsen and Toubro Ltd., Bombay.	Providing consultancy on R T D fluid bed drying
8. Larsen and Toubro Ltd., Bombay.	Grindability tests on limestone and clinker work
9. Director of Inspection, Madras.	Testing of neoprene material
10. Dharangadhra Chemical Works, Madras.	Micronising of iron oxide
11. Hyderabad Asbestos Cement Products Ltd., Hyderabad.	Fluid energy grinding of asbestos samples
12. Wheels India Ltd., Madras.	Research Project conducted on bio-gas from solid wastes
13. Brook Bond, Madras.	Tests conducted on spray dryer in H and M Transfer Lab.
14. Bush Boake Allen Ltd., Madras.	Drying of oxidized starch solution

### Indo-German Collaboration

- (a) Projects under this scheme.  
Design and Development of Multistage fluid bed reactor.
- (b) Value of assistance received.  
Equipment costing approx. DM 30,000 has been ordered and received under the project from Germany.

### Visitors to the Department

- |  |   |
|--|---|
| 1. Prof. H. Peter Hutchison,<br>University of Cambridge,<br>United Kingdom. 27-3-1979. | Survey of Process Simulation Techniques.  |
| 2. Prof. Ron. Hughes,<br>University of Salford,<br>United Kingdom. 22-3-1979           | Poisoning studies on a single catalyst pellet reactor.  |
| 3. Prof. Denn, M. M. University<br>of Delaware. 23-3-1979.                             | Simulation of high speed polymer melt spinning.   |
| 4. Prof Herbert Bock, Fachhochschule,<br>Frankfurt, West Germany.                      | How the performance of absorption depends on the operating temperature.<br>Structure of liquid solutions and surface effects.   |
| 5. Prof. H. Hammer,<br>T. U. Aachen. 7-3-1979.   | Reaction Engineering of bubble column with and without catalyst in suspension.  |
| 6. Prof. H. Brauer<br>T. U., Berlin.<br>15-2-79/28-2-79.                               | a. Abatement of harmful emissions.<br>b. Design of high efficiency dust cyclone.<br>c. Design of wet scrubber.<br>d. Catalytic treatment of waste gases.<br>e. Biological waste water treatment in a high efficiency reactor. |
| 7. Prof A. Holland,<br>University of Salford.<br>17-1-79.                              | The place of heat pump in energy spectrum.  |

- |   |  |
|---|--|
| 8. Prof. A. Fiechter,<br>T. H. Zurich.<br>23-10-1978. | a. Specification of bioreactors<br>b. Unconventional substrates<br>for microbes. |
|---|--|

### Invited Lectures delivered by the Staff

Title	Speaker
1. Modelling of Fluidisation	Seminar talk by Dr. T. Gopichand at Banaras Hindu University at Varanasi in July 1978.
2. Biochemical Reactor	Seminar talk by Dr. M. Satyanarayana at Banaras Hindu Univ. at Varanasi in July 1978.
3. Diffusion and Reaction in Solid-solid systems.	Seminar talk by Dr. M. Satyanarayana at National Chemical Laboratory, Poona, in Dec. 1978.
4. Fluidised Bed Reaction	Seminar talk by Dr. T. Gopichand at Coimbatore Institute of Technology, Coimbatore in May 1979.
5. Gas-Solid Reactions	Seminar talk by Dr. T. Gopichand at Osmania University in April 1979.
6. Analysis of Chemical Reactor	Seminar talk by Dr. Y. B. G. Varma at Regional Engineering College, Tiruchirapalli, in May 1979.
7. Optimality of Chemical Reactors	Seminar talk by Dr. Y. B. G. Varma at R. E. C., Tiruchirapalli in May 1979.
8. Stability of Chemical Reactors	Seminar talk by Dr. Y. B. G. Varma at R. E. C., Tiruchirapalli, in May '79.
9. Residence Time Distribution	Seminar talk by Dr. Y. B. G. Varma at R. E. C., Tiruchirapalli, in May 1979.
10. Optimal Design of Fluid Bed Reactors.	Seminar talk by Dr. Y. B. G. Varma at Coimbatore Institute of Technology, May 1979.



Title	Speaker
11. Modelling in Liquid-Liquid Extraction.	Seminar talk by Dr. P. R. Krishnaswamy at B. A. R. C., Bombay in November, '78.
12. Environmental Engineering in Cement Plants.	Seminar talk by Dr. M. Ramanujam, in December 1978 at Cement Research Institute.

### Others

Conducted lecture and Laboratory courses of LPRI organised by Plastic and Rubber Institute, Indian Section.

Conducted a course in Polymer Science and Technology for M. Sc.

Applied Chemistry Course of Madras University organised by Government Engineering College, Guindy, Madras.

## CHEMISTRY

Quality Improvement Programme/UGC Teacher Fellowship Programme :

(a) Serving teachers programme :

No. on rolls working for Ph. D. : 9

(b) Short term courses conducted :

A Course entitled "Advances in Chemistry at the service of Technology" of three weeks duration was conducted by the Department with Dr. C.S. Swamy and Dr. J. C. Kuriacose as the Co-ordinators. There were 15 participants.

### Important Lectures and Seminars

Title	Speaker
The Brain	Prof. T. Narendran, Head, Neurology Department, Madras Medical College, Madras.
Electrical properties of Heterophase glass systems	Prof. D. Chakravorthy, Head, Advanced Centre for Materials Science, IIT, Kanpur.
Raman & Infrared Spectroscopic methods for the study of molecular motions and interactions in liquids	Prof. Dr. J. Yarwood, University of Durham, U. K.

Title	Speaker
Micro-analysis by Raman Spectroscopy.	Dr. G. J. Rosasco, National Bureau of Standards, Washington, U. S. A.
Applications of computer techniques in Chemistry	Prof. B. R. Nagar West Germany.
Biological transmutations observations facts and theory	Dr. J. A. Carpentier, Visiting Professor, I. I. A. S., Simla.
Surface Chemistry of Polymers	Dr. James Boyle Craig, Aberdeen University, USA.
Electrical transport across immobilised membrane electrodes	Prof. Vakula S. Srinivasan, Bowling Green State University, Ohio, U. S. A.
Application of NMR to problems of organic chemistry	Prof. Dr. M. Gunther, University of Siegen, West Germany.
Silicon in the service of chemical synthesis	Dr. D. R. M. Walton from UK Visiting Professor at the Delhi University.

The first National Symposium on Thermal Analysis organised jointly by this department and the Indian Thermal Analysis Society was held at our Institute during 21 st December – 23 rd December 1978.

A two day symposium in Chemistry organised jointly by this Department, and Loyola College, Madras was held during the 1st week of March 1979.

### Research and Developmet

The Department is actively engaged in studies dealing with environmental pollution control and new energy sources.

### Assistance to Industry

The Department has been actively assisting many industrial establishments by utilising its analytical services involving the use of various equipments.

Methods for treating the effluents discharged by benefication plant of the Dharangadhara Chemicals Ltd., Arumuganeri, Tirunelveli District and by waste paper pulp plant of the Light Roofings Ltd., Chingleput

District have been developed. These organisations are in the process of adopting these methods for treatment and recovery of valuable by-products.

### **Special Honours/ Distinctions**

Two faculty members were awarded the Senior Fellowship of the Alexander Von Humboldt Foundation and one has already left to take up this assignment. One faculty member left for Holland on a Post Doctoral Fellowship.

### **Major Equipments added**

The following gift equipment of value DM 40, 000 was received by the department and is being installed. Philips Multifunction digital volt meter., Lauda Cryostat Leeds - Northrup K<sub>2</sub> Potentiometer, Siemens X-T. recorder Pressure Jump Autoclave.

### **Keithley Solid State Electrometer**

A Flash Photolysis unit with a stopped flow attachment of the value of about Rs. 3 lakhs has been purchased and is being installed. The equipment was purchased under a DST grant to the Department.

### **Other equipments added to the Department are**

EL Hygen Hydrogen Generator	Value Rs. 16, 000/ -
XY Recorder	Rs. 30, 000/ -
Magnet with power supply	Rs. 22, 000/ -
16 mm cine projector	Rs. 11, 000/ -

### **Invited Lectures by the staff**

Drs. C. S. Venkatachalam, V. Ramakrishnan, G. V. Subba Rao, V. Mahadevan and S. R. Ramadas delivered lectures in Guindy Engineering College on various topics in their M. Sc. ( Applied Chemistry ) course.

Prof. C. N. Pillai and Dr. D. V. Ramana gave lectures in Pachayappa's College, Madras on the eve of Gandhi Jayanthi Day in October 1978.

Dr. D. V. Ramana gave a talk on the applications of Mass Spectrometry in Central Food and Technological Research Institute, Mysore in June 1979.

The Department proposes to initiate a project for the process development and production of rare research chemicals to meet internal and external demands and to train our students in developmental work.

## CIVIL ENGINEERING

### Quality Improvement Programme

#### (a) Serving Teachers' Programme

M. Tech.	...	1
Ph. D.	...	11

### Continuing Education Programme

Name of the course	Coordinator
1. Matrix computer methods in Structural Analysis	Dr. V. Paramasivam
2. Workshop on Computer Aided design	Dr. C. S. Krishnamoorthy
3. Advanced course on Urban Transportation Management	Dr. D. J. Victor
4. Advanced Topics in Design of Tall Tower Structures	Dr. P. Srinivasa Rao and Dr. P. K. Aravindan

### Sponsored Courses

Limit State Design in Concrete Technology	Cement Research Institute of India, New Delhi.
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### Research and Development

#### Research Publications:

(a) Papers 40

(b) Books/Monogram (to be published)

1. Matrix Computer Methods in Structural Analysis  
Dr. V. Paramasivam — M/s. Sarita Prakashan, Meerut.
2. Structural Dynamics  
Dr. R. Radhakrishnan — Tata Mcgraw Hill Publishing  
Company Ltd., New Delhi.

## **Sponsored Research Schemes and Projects**

Departmental Projects only: about 50

### **Assistance to Industry-ICC**

The Department has been very actively engaged in giving consultancy services for major industries like Engineering Construction Corpn. Ltd, Bharat Heavy Electricals Ltd, and others.

### **Distinguished Visitors to the Department**

1. Dr. W. Stossinger Institut fur Wasserbau, T. U. Aachen, West Germany visited the Hydraulic Engg. Laboratory in connection with Joint Indo-German Project titled 'Study and the formation and movement of salt water interface near Madras coastal aquitus.
2. Dr. Knoche T. U. Aachen, West Germany visited the Hydraulic Engineering Laboratory.
3. Dr. H. H Dette, Professor of Coastal Engineering and Director, Academic Programme, Tech. Univ. Braunschweig, Germany visited Hydraulic Engg. Lab. and delivered lectures on academic and research programmes at Tech. University, Braunschweig, W. Germany.
4. Prof. Dr. Ing. J. Plahn, Professor, University of Hannover, West Germany, visited the Structural Engg. Lab, in connection with the Indo-German Joint Research Project on 'Development of a pretensioned prestressed concrete sleeper for the Indian Railways'.
5. O. Prof. Dr. Peter Jan Pahl, Director of the Institute for General and Theoretical Methods in Civil Engineering at the Technical University, Berlin, along with his assistant Dipl. Ing. K. Wassermann visited the Structural Engg. Lab. in connection with the Joint Indo-German Research Project on 'Systems Approach to Engineering Design-Structural Systems'. He delivered lectures on 'Optimization in Structural Design.'
6. Shri M. Asjad Ali, Member, Engg. and Planning, Bangladesh Railway Board, Shri I. A. Chaudhury, Project Manager, Bangladesh Railway visited the Structural Engg. Laboratory to witness the test and to discuss about the test on Double Shank Elastic Rail Spikes.
7. Prof. Dr. Ing. Heinrich Rothert, Head of the Institute for Engineering Mechanics in the University for Armed Forces, Hamburg, West

Germany delivered a few lectures and had discussions with faculty and research scholars.

8. O. Prof. Dr. Ing. Gunther Clauss, Technical University, Berlin delivered lectures and held discussions with Faculty and Research Scholars.
9. Shri B. Mohanty, Director General, RDSO, visited the Structural Engg. Laboratory to discuss about the research programmes in the area of prestressed concrete sleepers.

### **Training Course/Short Term Course attended by Faculty**

1. Dr. T. P. Ganesan and Shri V. G. Idichandy attended a course offered by Dr. Stein on 'Electrical Strain Gauges'
2. Dr. N. Rajagopalan and Dr. P. K. Aravindan attended a Training course on 'Tall Industrial Structures' conducted by Cement Research Institute, New Delhi.
3. Dr. M. Mohideen attended a Training Course on 'Mix Design and Quality Control of Concrete' conducted by the Cement Research Institute, New Delhi.

### **New Additions**

1. Vibration Bed in the Structural Engineering Laboratory
2. Standard ventilation room in Building Sciences Section.

## **COMPUTER SCIENCE**

### **Courses in PG Programme**

1. Additional elective courses have been introduced in recently developed areas of Microprocessor systems, Data Communication and Data Base Technology.
2. Projects for student theses are chosen to be in consonance with general requirements in the Indian Industries in the area of Software development.
3. A good balance between concepts and practice is now incorporated in the curriculum.

## Education Programmes

1. Continuing education programmes offered:
  - a) COBOL Programming and Applications
  - b) Computer Oriented Operations Research & Simulation
2. Other courses conducted
  - 1) Introduction to Computers
  - 2) Modern Computers Concepts

The above two courses conducted jointly with Computer Society of India, Madras Chapter, for the benefit of Computer professionals in the country.

## Important Lectures and Seminars

	Title	Speaker
1.	Local Area Communications and Distributed Processing	Prof. Wilkes Cambridge University
2.	Regular Sets and dynamic Logic	Prof. R. Parikh Boston university
3.	Data Flow Machines	J. Bharadwaj, University of Utah.
4.	Structured Programming and verification	K. V. Nori, IIT / Kanpur.

## Research and Development

- a) Research publications : 12
- b) Patents granted :
  1. Unit for simultaneously recording two signals on a single track of a Cassete recorder.
  2. A Digital frequency meter.

## Assistance to Industry

Details of Research and Consultancy Projects :

S. No.	Project	Agency
1.	Developing an Economic Model for Fertiliser recommendation based on maximum yield	Agricultural Department, Government of Tamil-nadu.

S. No.	Project	Agency
2.	Advisory Consultancy on Software and Computer Systems	Tata Consultancy Services.
3.	Integrated Simulation Model for Nutritional system applicable to the Tamilnadu State	Food and Nutrition Department.
4.	Marketing Information System	SPIC
5.	Single Track Rail Simulation	RDSO
6.	Simulation of the effectiveness of feeding programs for malnourished children	Social Welfare Department, Tamilnadu.
7.	Computerization of Telephone Directory	Madras Telephones
8.	Optimum Oil Tanker Scheduling	IOC
9.	Development of software for computer system simulation	Administrative Staff College
10.	Software conversion for Die Design system	Controls and Drives Corporation, Coimbatore.

### **Indo-German Collaboration**

Digital link to connect PDP-11 and I BM 370/155.

Assistance received Rs, 75000/-.

### **Special honours/distinction conferred on staff with details**

Prof. Mahabala has been made a member of the Executive Council of INSDOC.

Dr. C. R. Muthukrishnan was elected as the Division II (software) representative of the CSI.

Dr. C. R. Muthukrishnan is a member of the Executive Council of CFTRI., Mysore.

Dr. C. R. Muthukrishnan is a member of the Advisory Council for INSDOC Madras unit.



### Other information

Equipment added :	Z-80 Software Development board M 6 800 Microprocessor board Two Alphanumeric displays
Equipment constructed	General purpose curve display communication link to 370 using INTEL 8085 Microprocessor 4-Terminal Computer System for student learning.

### Invited lectures delivered by staff

1. Professors H. N. Mahabala and C. R. Muthukrishnan delivered a series of lectures to the Tata-Burroughs system group of Advanced Computer Concepts.
2. Prof. C. R. Muthukrishnan, Dr. R. Kalyanakrishnan and S. Srinivasan were invited to organize and present a short course on Modern Computer System to the Systems Professionals at TELCO, Jamshedpur.
3. Prof. C. R. Muthukrishnan, Dr. R. Nagarajan, Dr. Kalyankrishnan and S. Srinivasan were invited to organize and present an in-house training program on Computers in Engineering for the Engineering group at Ashok-Leyland.

### Any other information

The Computer Centre has promoted Computer Applications in Engineering, Social Sciences and Management optimization. As a result of this, the Centre has earned by way of Computer charges a revenue of Rs. 31. 34 lakhs during 78-79.

The training offered and the expertise generated at the Centre has been well appreciated by the Nayudamma Committee which has recommended that I. I. T., Madras be identified for expanding Computer Science activity in the country and establishing a Computer Science Centre.

### Future plans

- a) Computer facility is to be expanded for
  - i) meeting the requirements for a large facility in the region especially for Data Base Applications.

- ii) For providing undergraduate training in the use of Computers for Engineering problem solving
- iii) Developmental activity in the area of Data Communications and a Campus Computer Network.

## ELECTRICAL ENGINEERING

### Educational Programme

1. QIP short term course on 'Modelling' and Analysis of fields in Modern Electrical Power Equipments' in May-June 1979 (3 weeks)

Coordinator : Dr. S. S. Yegnarayanan

2. CSD Short term course on 'Microwave Communication System' in Nov-December 1978 (3 weeks)

Coordinator : Dr. D. K. Banerjee

3. CSD Short term course in Antenna Analysis and Design in December 1978 (10 days)

Coordinator : Dr. M. S. Narasimhan and

Mr. M. C. Chandramouli

### Lectures delivered by invited speakers

Title	Speaker
1. Lecture series on 'Digital Transmission of TV Signals and Advanced Digital Systems.	Prof. Dr. P. W. Besslich, Univ. of Bremen, west Germany.
2. 'High Frequency Diffraction Techniques.'	Dr. P. H Pathak, Ohio State University, USA
3. 'Six Phase Power Transmission Systems'	Dr. S. S. Venkata, West Virginia University, USA

**Invited Lectures delivered by the Department Faculty at outside organisation/seminar**

Title	Speaker	Organisation where delivered
1. Asynchronous Operation of Synchronous Machine'	Dr. A. Kuppurajulu	BHEL Ltd. Hyderabad.
2. General Aspects of an inverted fed induction motor drive.	Dr. Vedam Subrahmanyam	Seminar on Recent trends in Drives and Control at College of Engg-Madras.
3. 'Application phase shift of modification Techniques for the design of speedchange single winding induction motors.'	Dr. P. Sasidhara Rao.	Seminar on Recent trends in Drives and Control at College of Engg. Madras.
4. Analytical tools for electromagnetic design Studies of linear electric machines for transportation systems.	Dr. S. S. Yegnanarayanan	Workshop cum Seminar on Technological Forecasting in Transportation by DST at I. I. T. Kanpur.
5. General Theory of Diffraction.	Dr. M. S. Narasimhan	IEEE-AES/COM Chapter at New Delhi.

**Research and Development**

1. Number of Research papers published (During 1978-79)	33
2. Number of Technical Reports submitted (from CSD)	5

## 3. Major sponsored research schemes and projects in progress

- |                      |    |
|----------------------|----|
| a) Elec. Engg. Dept. | 6  |
| b) CSD               | 10 |

**Indo-German Collaboration**

Projects under the scheme are

- 1) Speed control of a squirrel cage induction motor.  
Indian Coordinator: Dr. B. Ramaswami
- 2) Microwave Communication Systems:  
Indian Coordinator: Dr. D. K. Banerjee
- 3) Data Link between PDP 11 and IBM 370 computer:  
Indian Coordinator; Dr. H. N. Mahabala

**Major consultancy Assignments completed**

Job title	Organisation
1. Symmetrical 3 phase short circuit studies on Computer (Dr. A. Kuppurajulu, Dr. K. R. Nair)	Tamil Nadu Electricity Board.
2. Stability Studies of Generators connected to Multimachine systems (Dr. A. Kuppurajulu and Dr. S. Elangovan)	BHEL Ltd., Hyderabad.
3. Computer Programme Development of Load Flow Solution (Dr. A. Kuppurajulu and Dr. K. R. Nair)	M/s Tata consulting Engineers, Bombay
4. Design Optimization of transformers (63 KVA to 10 MVA) (Dr. V. V. Sastry and Dr. G. S. Rao and Dr. P. S. Rao)	M/s Transformers & Switchgear, Madras.
5. Design Optimization of Induction motors (1 hp to 20 hp) (Dr. V. V. Sastry, Dr. G. S. Rao and Dr. P. S. Rao)	M/s Kirloskar Elec. Co. Ltd. Bangalore.

6. Development of MOS Varactors CSIR, New Delhi  
(Dr. M. K. Achuthan, Dr. K. R. Rao  
and Dr. T. J. Vitto)

### **Assistance to Industry – ICC**

The Department has also contributed to industrial consultancy and testing through ICC as per following details.

Year	No. of Jobs	Turn-over
1976-77	124	Rs. 1.60 lakhs.
1977-78	131	Rs. 1.54 lakhs.
1978-79	135	Ra. 2.79 Lakhs.

### **Development Programmes likely to come up in the near future**

Acquisition of Micro-processor-based systems which will enlarge the scope of R and D work in the design and operation of microprocessors and their application in diverse fields of Electrical Engineering.

Application of TV for instructional purposes.

## **MATHEMATICS**

### **Research and Development**

#### **Papers :**

During the above period 26 papers were published in reputed journals.

#### **Books & Monograms :**

S. K. Srinivasan and R. Subramanian : 'Probabilistic Analysis of Redundant Systems', to be published by Springer Verlag, West Germany (1979).

### **Visitors to the Department**

Dr. R. Pincus of the Institute of Mathematics and Mechanics, Academy of Sciences, GDR.

### **Any other information**

The Journal of Mathematical and Physical Science, a research Journal, international in character, published by this Department continues to attract good quality research papers. So far 12 volumes, 58

numbers and 7600 pages have already been published. Under the mutual exchange of publication programme initiated by this Department as on date we are receiving 68 Research journals from abroad and India.

Developmental programme likely to come up in the near future :

Intensive research and developmental activities are proposed to be taken up in the following areas.

Analysis, Fluid Mechanics and Solid Mechanics. Probability and Combinatorial Mathematics, Graph Theory, Theoretical Physics and Statistics.

## **MECHANICAL ENGINEERING**

### **On Courses :**

New Programmes introduced :

M. Tech. in Production Engineering

### **Education Programmes**

Continuing Education Programmes :

“Optical Methods of Measurement in Engineering”  
(December 4 to 17, 1978, 29 Participants-ISTE sponsored)

Winter School in ‘The Design of Heat Transfer Equipment’  
(December 2, 1978 to December 16, 1978-18 participants)

Advanced training Course programme for HAL Process Engineers

i) February 12 to April 20, 1979-24 participants

ii) May 14 to July 20, 1979-24 participants

Short term course on ‘Utilisation of Solar Energy for Agricultural and Food Applications’ (December 18 to 30, 1978, 10 participants)

Axial flow fans, blowers and compressors—  
(December 11 to 22, 1978-12 participants)

Centrifugal fans, pumps, compressors and RIF turbines  
(June 11 to 22, 1978-7 participants)

### **Quality Improvement Programme/UGC Teacher Fellowship Programme :**

Serving Teachers Programme:

	M. Tech.	M. S.	Ph. D.
No. trained so far for	26	—	11
No. on rolls in each of these courses	2	2	18

### **Important Lectures and Seminars**

- a) National Design Engineering Conference was conducted during 15th and 16th of December, 1978.
- b) 'Data dependant system in Production Engineering' Dr. Pandit of Michigan State University, U. S. A.
- c) 'Solar Energy Activities at the Institut fur Thermodynamik und Warmetechnik Der Universitat Stuttgart, by Dipl.-Ing. E. L. Schmidt, Universitat Stuttgart, West Germany on 3-4-1979 at the Seminar Room of the Refrigeration and Air-Conditioning Laboratory.

### **Research and Development**

Research Publications :

- a) Papers 109
- b) Books/Monograms : 'Experimental Techniques in Metal Cutting' by V. C. Venkatesh and H. Chandrasekharan under publication.

Departmental Projects : 86

### **Assistance to Industry - I. C. C.**

- a) Calibration and testing of thermocouples
- b) Pressure gauges and fuel oils-Testing of
- c) Testing of solar collectors
- d) Development of burners
- e) Consultancy in the area of liquid fuel combustion
- f) Designing and fabricating of Mobile Vapour Compression Demonstration Panel one to : Walchand College of Engineering, Sangli, Maharashtra and one to : Telecommunication Training Centre, Jabalpur
- g) Development of heat transfer data for finned tubes - M/s. Bharat Heavy Plate and Vessels Ltd , Vishakapatnam
- h) Calibration of gauges and surface finish measurements
- i) Performance evaluation of drill bits for M/s. Steel and Allied Products Ltd., Calcutta

- j) Assessment of Industrial Project Report for State Bank of Hyderabad
- k) Carried out jobs on Unconventional Machining Processes
- l) Friction and wear testing of sintered clutch liners for M/s. Scooters India Ltd.
- m) Calibrating Dynamometers for M/s. Bharat Hyavy Electricals Ltd., Madras.
- n) Stress Analysis of a Mill role of mill line for M/s. Dunlop India Ltd., Madras.
- o) Design of Planetary Gear Box for 40 T EOT Crane for M/s. Southern Structurals Ltd., Madras.
- p) Inspection of fabrication of 136 Mhz Antenna for Defence Electronics Applications Lab., Dehra Dun.
- q) Projects through I. C. C. were taken up and completed. The projects consisted mainly of testing and development work in I. C. Engines
- r) BHEL project on Bulb Turbines for design, testing and development of Ns-1250 rpm bulb turbine model.
- s) Calibration of Venturimeter for M/s. Jyoti Ltd., Baroda
- t) Testing of sluice value for ISI marking
- u) Testing and calibration : Calibration of temperature indicators & thermocouples-Thermo-physical property measurements are undertaken.
- v) Tool Maker's Microscope (NRDC project)
- w) Coin Sorter (Marshall and Sons, Madras)

### **Indo-German Collaboration**

Projects under this scheme :

1. "Precision Glass Scales"
2. A 4½ lakhs Indo-German Project on Heat Transfer studies in large rotating electrical machines is completed.
3. Project on 'Alternative Fuels for I. C. Engines'
4. 'Utilisation of Solar Energy for Cold Storage of Food products'
5. Energy centrifugal compressors.



**Value of assistance received**

1. DM 50,000
2. Rs. 70,000/- from IIT, Madras and DM 50,000 from West Germany.
3. Rs. 70,000/-
4. DM 50,000 - Rs. 75,000/- (proposed)

**List of staff who have joined as expert from Federal Republic of Germany**

Dipl.-Ing. E. L. Schmidt, Universitat Stuttgart, West Germany, visited our Laboratory for the period of one month.

**List of staff who have gone to Federal Republic of Germany, under this scheme.**

- a) Dr. P. Srinivasa Rao, Lecturer, I. C. Engines Laboratory, visited the Technical University Aachen, West Germany, under the Indo-German Project, during July-September, 1978.
- b) Dr. V. Seshagiri Rao, Assistant Professor.

**Special honours / Distinctions conferred on the members of the staff with details**

- a) Dr. V. C. Venkatesh was awarded Institution of Engineer's institution prize for the best paper - December, 1978
- b) Dr. M. V. Krishnamurthy was awarded Alexander Von Humboldt fellowship and proceeded to West Germany on Sabbatical leave with effect from 11-5-1978
- c) Dr. M. C. Gupta has been re-elected Director of International Solar Energy Society for a second term.
- d) Dr. R. Natarajan appointed Member, International Editorial Board of the journal "FUEL".

**Additional space / laboratory etc. provided**

30 sq.m. - Fine Technics Laboratory

Extension of first floor and second floor over the Machine

Elements bay of the Laboratory is under construction

(M.E. & M.H, Laboratory)

New Laboratory is under construction. (Thermal Turbomachine Laboratory)

**New Major equipments added**

1. Wireless data transmission and receiving system - 5 channels
2. HMT LB - 17 Lathe
3. Photophone overhead projector
4. One Madras GD Lathe for the workshop
5. Laser Doppler velocimeter imported

**Fabricated**

1. Set up for testing of heat exchanger cores
2. Hydrair cooler for food products
3. Vacuum cooling equipment for food products
4. Set up for measurement of thermal conductivity of porous materials such as food products, insulations etc.
5. Fabrication of abrasive jet machining set up
6. 3 dimensional velocity measuring probes
7. Calibration equipment for above

**Visitors to the department**

1. Dr. K. F. Knoche from West Germany
2. Dr. Hollands from England
3. Prof. Dr. Ing G. Bechtlof from West Germany visited the laboratory for 4 months
4. Prof. Lewis, University of Newcastle Upon Tyne
5. Shri S. L. Abhyankar, Technical Manager, Khimline Pumps
6. Sri R. K. Srivastava, Head, Pumps Div., Jyothi Ltd. Baroda
7. Prof. W. Scheer
8. Dr. Pandit, University of Michigan, USA
9. Dr. Powel, Technology Consultancy Centre, University of Science and Technology, Kumasi, Ghana.

**Invited Lectures delivered by the staff:**

1. Professor M. V. Krishna Murthy delivered a Key Note address entitled 'Heat Mass and Transfer in Food Products' at the 6th International Heat Transfer Conference held at Toronto, Canada, 1978.

2. Dr. V. C. Venkatesh : Lecture — 3 day seminar on Manufacturing, at TELCO, Jamshedpur.
3. „ „ — 3 day seminar on Manufacturing at BHEL, Hyderabad.
4. Dr. V. Radhakrishnan „ — at BHEL, Delhi on Quality Control.
5. Dr. H. Chandrasekharan „ — at college of Engg. Guindy, Madras.
6. Selection, design, construction, application and maintenance of industrial process pumps - Lecture delivered at the CLINIC on Industrial pumps organised by Indian Institution of Plant Engineers, Tamilnadu Chapter on 3-3-79 by S. Kumaraswamy.
7. Design and application of reversible pump turbines. Design of bulb turbines. Lectures delivered at M/s Jyoti Ltd , Baroda on 12th and 13th March, 1979 by Dr. H. C. Radhakrishna.
8. Lectures were delivered at Summer School held in Chandigarh.
9. Lectures were delivered at BHEL, Hyderabad.
10. Dr. M. C. Gupta delivered a series of lectures on Solar Energy in Mexico.
11. Dr. R. Natarajan delivered two lectures in Banaras Hindu University on Combustion and Alternative Fuels.
12. 4 lectures at MIT, Madras.
13. Dr. V. M. Krishna Sastri delivered a lecture on 'Applications of Solar Energy' during the workshop on Energy, Technologies, Dec. 20, 22-1978, organised by the Regional centre for Energy, Heat & Mass Transfer for Asia & the Pacific, I. I. T. Madras-36.
14. On 4-12-78 (Monday) Mr. K. V. Chalapathi Rao delivered a Guest lecture on Boilers, Furnaces etc. Refractories, lagging etc. in connection with the winter school on 'Fuel Economy' at Thiagarajar Polytechnic, Salem.
15. On 12-6-78 Mr. K. V. Chalapathi Rao delivered a lecture on 'Heating and Cooling of Turbogenerators-Network methods'

in connection with QIP Short term course on 'Modelling and analysis of fields in Modern Electrical Power Equipment organised by the Dept. of Electrical Engg., I. I. T. Madras.

### **Any Other information**

1. Dr. M. Ravindran attended the International Conference on Future Energy Concepts, organised by Institution of Electrical Engineers, London and presented a paper. His trip was financed by the Institute and COSTED. He visited some of the Laboratories in UK where research in Turbomachines is going on at the courtesy of British Council.
2. Mr. Balabaskaran has taken up research associateship at University of Newcastle Upon Tyne for a period of 2 years under extraordinary leave.
3. Dr. V. C. Venkatesh attended CIRP Conference at Einhoven Aug. 1978 (Presented 3 papers).
4. Dr. H. Chandrasekharan attended CANCAM Conference, at Canada June 1979 (Presented a paper) and visited Europe.

### **Developmental Programme**

1. Specialised research in the field of Metal Cutting, Grinding, Unconventional Machining, Surface integrity and stress measurements are proposed.
2. Projects in the field of Heat & Mass Transfer are in fundamental studies ; to cite a few,
  - Gas Fluidized bed heat transfer.
  - Solar Drying
  - Thermal Energy Storage
  - Heat transfer in rotating electrical Machines.
  - Film Boiling Heat Transfer & Two phase flow.
3. Combustion & propulsion: Ph.D. level projects are under progress in the areas of shock tube techniques, combustion in swirling flows, droplet combustion and turbulent flames. It is proposed to initiate new projects in the areas of flame quenching acoustic burners and spray combustion. Proposals for collaboration through sponsored projects on a solid propellant

rocket ramjet engine and liquid propulsion rocket systems are under consideration.

4. Solar Energy: Ph.D. level projects are in progress in the areas of continuous absorption type refrigeration system, compound parabolic concentrators and in incorporating mirror boosters in flat plate collector systems. It is also proposed to investigate energy storage systems and solar thermal power plants.
5. In collaboration with ARDB Project on centrifugal compressor for Helicoptors—is to come up soon.
6. A proposal for 100 KW Axial impulse turbine is submitted to DST, New Delhi.
7. Some additional test stands for research and students' laboratory work; Acquisition of Material Testing machines.
8. The I. C. Engines Laboratory will continue its research programmes in the following fields. It is also being attempted to secure sponsored projects in the field of Alternative Fuels.
  - a) Alternative fuels including Hydrogen, bio-gas and alcohols.
  - b) Pollution control problems in I.C. Engines.
  - c) Fundamental studies in combustion, air movements etc. in engines.
9. A thorough change in the curriculum for the M.Tech Mechanical (Refrigeration and Air conditioning elective) course is proposed to make the course more practical and industry-oriented.

Utilisation of Solar energy is proposed to be introduced as a compulsory course for the above course.

10. Emphasis on research work on energy conservation and solar energy utilisation is envisaged.

A project proposal of Rs. 2 crore budget estimate is submitted to Department of Science and Technology on Solar Energy Utilisation.

## **METALLURGY**

### **Educational Programme**

Department offers graduate and post-graduate programmes in Metallurgy, with specialisation at the post-graduate level in the following fields :

1. Iron and Steel Technology
2. Materials Technology
3. Metal Casting
4. Metal Forming
5. Metal Joining

### **Quality Improvement Programme**

Ph. D. — 2

### **Seminars/Courses organised**

1. Engineering fracture mechanics - A four-day course in April 1979—Sponsored by the Industrial Metallurgy Division of the Indian Institute of Metals.
2. Quality control of moulding Materials-22nd to 25th June 1979-Sponsored by the Industrial Metallurgy Division of the Indian Institute of Metals.

### **Lectures**

Special Lectures on various topics were delivered by the staff members of the department at Guindy Engineering College, Madras, Regional Engineering College, Trichy, Advanced Training Institute, Madras, National Productivity Council, Madras, and Indian Institute of Foundrymen. In addition lectures were delivered by the staff members in the special courses organised by the departments of the Institute like HAL process planners course. HAL-BEML Management Training Programme.

### **Research and Development activities**

- a) Sponsored research Projects :
  - Development of melting fabrication and surface protection technology magnetisium alloys - Ministry of Defence DRDL, Hyderabad.
- b) Welding characteristics of nickel steels-Ministry of Defence DMRL, Hyderabad
- c) Properties of materials of construction at low temperature with Department of Physics, I. I. T., Madras and Indian Institute of Science, Bangalore—Department of Science and Technology.

- d) Recycling of grinding sward—Department of Science and Technology.
- e) Welding of dissimilar metals and alloys used in the Nuclear Industry—Department of Atomic Energy.

### **Assistance to Industry**

The Department continued, as usual, to maintain good liaison with industries and assist them on technological matters. One of the major activities undertaken during the year under perview has been testing of welding personnel for Sembaving shipyard, Singapore.

Publications : 35

Patents : Four Patents filed

### **Indo-German Collaboration**

- a) Indo-German Project on 'Improvement in weld quality of wheels' has been completed.
- b) Dr. S. Prasanna Kumar visited the Technical University of Braunschweig and other Institutes in Federal Republic of Germany under DAAD-reinvitation programme.

### **Honours and distinctions awarded to the Staff**

1. Dr. E. G. Ramachandran, Senior Professor of the Department had the distinction of being elected as Chairman, Industrial Metallurgy Division of the Indian Institute of Metals.
2. Dr. D. R. Gopala Krishna Achar was invited by the Department of Metallurgical Engineering, Banaras Hindu University as the visiting faculty to deliver a series of special lectures in the area of Metal joining.
3. Dr. Achar received a cash award from D and H Secheror Electrodes Pvt. Ltd., for the research paper presented in the National welding seminar 1979 organised by the Indian Institute of welding.

### **Developmental Programmes envisaged**

Following are some of the developmental activities to come up in the near future.

1. Development casting processes

2. Development of foundry equipment
3. Development of instruments for quality control of moulding materials.
4. Electron beam and laser beam welding and cutting.
5. Weld simulation studies.

### PHYSICS

New Courses introduced for the  
M. Sc., and Ph. D. Students.

1. Physics and Technology of High Vacuum.
2. Quantum Theory of Solids.
3. Experimental Solid State Physics.
4. Advanced Solid State Physics.

### Educational Programme

- a) A course on 'Principles of Cryogenic Engineering Design' organised for participants from industries and research organisations.
- b) A Workshop on 'Vacuum and Cryogenics' organised in collaboration with Indian Vacuum Society and Regional Cryogenics Council.
- c) Continuing education programme for teachers of Kendriya Vidyalaya conducted in 1978.
- d) Under the U. G. C. Teacher Fellowship Programme 10 University teachers are working for Ph. D. Degree in the Department.

### Important Lectures and Seminars

Title	Speaker
Vibration Spectroscopy of hydrogen bond in Solid State	Dr. Novak Alexander France.
Spectroscopic studies on N. Methylacetamide (IR, Raman and Neutron Inelastic scattering) Non Planar structure.	Dr. Filloux Francois France.
Technology Assessment	Dr. Hetman, Germany.
Synchrotron Radiation Applications.	Prof. Mc Gowan, Canada.



Biological Energy Conversion Mechanism	Prof. T. Ramasarma, I.I. Sc., Bangalore.
Neutron Scattering	Prof. M. R. Bhiday, Poona University.
Plasma Energy sources	Prof. M. S. Sodha, I. I. T., Delhi.

### **Research and Development**

#### Research Publication

Total Number of papers published 42

Number of Ph. D. during the year 4

### **Participation in International Conference**

Dr. A. V. Narasimham participated in the International Symposium on Non linear Acoustics held in Paris.

Dr. S. Srinivasan participated in the International Conference on teaching/learning process in Universities held in Malaysia, Penang.

### **Indo-German Collaboration Projects**

The Projects under this scheme

- |  |   |
|--|---|
| a) Preparation and investigation of magnetic materials of technical interest.  | Prof. C. Ramasastry<br>Dr. K. V. S. Rama Rao<br>Dr. Weiss |
| b) Design and construction of cryogenic equipment like centrifugal pumps etc., | Prof. R. Srinivasan<br>Dr. Klipping                       |

## **HUMANITIES AND SOCIAL SCIENCES**

New Courses introduced : Three new courses are introduced. Two of them offered to Applied Mechanics and one to Metallurgy.

The following Courses were conducted for the benefit of practising Executives :

- (i) IIT-IAMM Certificate course in Materials Management.

- (ii) IIT-MPC Post Graduate certificate course in Industrial Management.
- (iii) IIT-MMA certificate course in Manufacturing Management.

### **Quality Improvement Programme/UGC Teacher Fellowship Programme**

Serving teachers programme :

No. trained and on rolls in each of these courses (M. Tech/Ms/Ph.D) - one.

### **Important Lectures and Seminars**

Title	Speaker
Industrial Safety	Sri K. S. Narasimhan, Group Industrial Engineer, Sundaram Clayton Ltd., Madras.

### **Research and Development**

Research Publications : (i) Papers— Three

### **Assistance to Industry— ICC**

The Department has completed three consultancy assignments and there is one on-going assignment.

### **Invited Lectures Delivered by the Staff**

Several faculty members have participated in executive development programmes organized for industry such as Shaw Wallace and Co., Administrative Staff College, Madras Productivity Council, National Productivity Council, Madras Management Association etc.

## **CENTRAL LIBRARY**

The significant activities of the various divisions of the Library are as follows :

### **Administration, Reprography & Bindery (ARB) Division**

The sale of certain publications of the QIP and the Library's own publications continued to be handled by the Library office. The

reprographic services continued to be made available to all the members of the Institute as well as outsiders.

The IIT Madras hosted the 8th IASLIC Seminar (26-29th December 1978) at our Institute Central Lecture Theatre with financial assistance from CLRI and other organisations.

Mrs. J. Durairaj attended the Biannual 8th IATUL Conference at Enschede, Netherlands (May 28-June 1, 1979)

Sri K. Sankaran and Kum. D. Sobharao attended the XXV (Silver Jubilee) All India Library Conference at Trivandrum (May 14-18, 1979).

### **Circulation, Reference & Maintenance (CRM) Division**

The Central Library which is the National Centre for Partial Archives in India for Scientific and Technical films of the Encyclopaedia Cinematographica of Gottingen, West Germany, continued to serve the scientific community of India by loaning its films. To this we added over 8 motion films—both sound and silent and a cumulative Catalogue is being brought out. The newly introduced system overnight loans of textbooks for students continued to be popular and helpful to them. The inter-library co-operation among the various libraries in India was further developed in order to be helpful for the library clientele during the year under review. The publications numbering over 4000 reported as missing by the Stock Verifier over a period of 14 years have been traced and an equal number are to be accounted for.

### **Acquisition & Processing Division (R & P)**

There has been some delays in purchase of books due to increase in the number of projects and increase in the budgetary allocation for the Library coupled with shortage of staff as stated earlier. However, plans are underway to develop and reactivate more contacts with foreign publishers and distribution agencies.

### **Periodicals & Documentation Division (P D)**

The temporarily suspended documentation service was revived in a modified manner and issued as Library Documentation Notes as a weekly indexing journal covering research needs of scientific and technical staff of our Institute as well as other Institutes.

Research Profiles of about 100 faculty members / Research Scholars were collected and information relevant to their topics is disseminated

through the Weekly Documentation Notes which is issued in two parts - Part A covering Physical and Chemical Sciences and Part B Engineering, technology and applied sciences. Over 1100 Foreign and Domestic technical periodicals are covered in these notes.

The service is also extended to outside organizations on subscriptions basis. 22 Institutions / have availed of the Service during the year.

The Library arranged for subscription of about 139 titles by Surface Mail. 25 new titles were added to the already 1159 titles subscribed in the past.

The Translation Service also continued to both the Library's Internal as well as external members.

### Statistics on other Library activities

#### Library Membership :

1. Institute Members (Staff & Students)	—	5,473
2. Outside Members : Individual	—	4
Corporate	—	31
3. Consultation permits	—	84

#### Circulation :

1. No. of readers visited	—	96,334
2. No. of volumes issued	—	98,595
3. No. of reservations for books : Registered	—	5,257
Fulfilled	—	4,000
4. Amount of overdue and other charges realised	—	Rs. 40,168
5. Inter-Library Loans : borrowed for		
Institute members.	—	155
Lent out from Institute Library	—	124

#### Acquisition :

Books and bound volumes of periodicals	—	5,994
Pamphlets and reports	—	1,314
Microfilms and microfiches	—	100
Ph. D Thesis	—	47
Total intake during the year	—	7,455
Total accessions upto June 1979	—	1,67,497

**Current Periodicals**

By subscriptions	—	1,159
From Technical University, Berlin (under aid)	—	62
By exchange/gift	—	175
LDN recipients : Internal	—	170
External	—	22
Translations arranged	—	19

**Reprographic Service**

Microfilms made	579 frames
Korestat copies	5,531 pages
Gevafax copies	94,808 pages

**Binding**

No. of books and journals bound for library	1,877
No. of stationery forms and registers bound	1,503
No. of publications (reports, etc.) of departments bound	536

**CENTRAL WORKSHOP****Major Jobs done in the Central Workshop**

1. Grinding of Thoriated Tungston Electrodes Department of Atomic Energy, Kalpakkam, Tamil Nadu.
2. Fabrication of fine module gears Central Vehicle Research and Development Establishment, Avadi, Madras.
3. Patterns & Castings for D. S. T. Project Thermal Turbomachines Lab., Department of Science & Technology Project, IIT.
4. Rewinding of 45 H.P. Slip ring induction motor R & A/c Maintenance, IIT
5. Fabrication of Anechoic Chamber for Measurement of Noice Levels Metrology Lab., Mech. Engg. Department
6. Fabrication and Assembling of Ultrasonic Drilling Machine Production Engg. and Machine Tools, Mech. Engg. Department IIT

- |  |   |
|--|---|
| 7. Dynamic balancing of variable speed pulleys | M/s. Balaram Engg. Works, Madras-1.             |
| 8. Bevel and Spur Gears for Printing Machines  | The Standard Workshops, Madras.                 |
| 9. Bevel gears for Switch Gear                 | M/s. Hackbridge Hewittic & Easun Ltd., Madras.  |
| 10. Calibration of Pressure gauges             | M/s. W. S. Insulators of India Ltd., Madras-16. |

WORK ORDERS COMPLETED DURING THE YEAR — 1271

### INSTITUTE HOSPITAL

The Institute Hospital is a 30 bed Hospital serving a Campus population of nearly 10,000 (students and staff) and a daily outpatient on an average of 300 patients.

Dr. A. B. Marikar, M. D.-Retired Director of Medical Services is the Hony. Adviser. She resigned in January 1979.

Dr. M. S. Prakas, M. S., F. I. C. S. is the Medical Officer-in-charge of the Hospital and Surgeon.

Dr. A. L. Annamalai, FRCP, FICA, FCCP, D.T.M. & H. and Dr. P. M. Palani, M. D. are the Part-Time Physicians taking the main load of the Medical O. P.

Dr. T. Ramadass, B. Sc., M. S., F. I. C. S., D. L. O. is the Part-Time E. N. T. Specialist. He is developing his department.

Dr. Lalitha Kumari, M.B., B.S., D.G.O. Joined this Institute on 16-1-78.

Dr. Radha Rajagopalan, M.B., B.S., A. B. (Paed. USA), Paediatrician joined the Institute Hospital on 16-3-1978 and is organising the Paediatric work.

Dr. Sumati Khangaonkar, M.B., B.S., D. A - Part-time Anaesthetist joined this Institute Hospital as full-time Anaesthetist on 4-7-'78.

Dr. T. P. Alaganantham, M. B., B. S. is the Resident Medical Officer and Surgical Assistant.

Dr. N. A. Jayavelen, M. B., B. S. is the general duty Junior Medical Officer (assisting the Physicians).

New Equipments : A new 3 Channel E. C. G. Machine has now been installed and has helped greatly in the diagnosis and treatment of cardiac states.

Schemes for (i) an X-Ray Plant and Water-Cooler & (ii) a Bio-Chemistry department have been proposed.

Building : Schemes and plans for a Surgical and Gynaecological Theatre with post-operative beds for men, women and children and an intensive care unit have been proposed.

Staff : Schemes for additional staff—Para-Medical and Medical staff in proportion to this Hospital have been proposed.

The Institute Hospital works 24 hours of the day and 365 days of the year and gives efficient medical, surgical (including E. N. T.), gynaecological and paediatric medicare to the Campus.

Total number of Out-Patients	—	1,00,436
Total number of In-Patients	—	1,078
Injection O. P. }	July '78 to December '78	— 16,211
	January '79 to June '79	— 18,768
		— <u>34,979</u>
Dressing O. P. }	July '78 to December '78	— 6,297
	January '79 to June '79	— 5,373
		— <u>11,670</u>
Emergencies attended		
July 1978 to December 1978		1,249
January 1979 to June 1979	—	461
		— <u>1,710</u>

### PLACEMENT OFFICE

During the year under review nearly 160 companies/establishments from public and private sectors contacted the Placement Office. Representatives from 72 companies visited this Office and conducted campus-interviews.

To facilitate quick placement, this Office continues to keep in touch with such industries and organisations as may require technically qualified personnel and furnishes them with information about the courses offered and specialisations available in I. I.T., Madras. Since

the Institute has on its rolls students from foreign countries also. Placement Office sponsors these students to employment organisations in their home countries.

In addition, this office handles applications from students of Undergraduate and Postgraduate courses for practical training during the summer vacation. While enabling the students to acquire practical experience, the training also serves to help the industries in making use of their services and assessing their potential.

The Placement Office looks after the work pertaining to the Alumni Association of the Institute.

### **NATIONAL CADET CORPS**

This unit has been sponsored by Indian Institute of Technology, Madras. This imparts general service Training and training in Aeronautical Engineering subjects to Cadets who are students of IIT, Madras.

The Unit has the following officers :—

Officer commanding	: FLT. Lt. S. S. Yegnaswami
Administrative Officer	: FLT. LT. O. N. Misra
NCC Part time Officers	: FLT. LT. V. Subramaniam and Fg. Offr. K. V. Chalapathi Rao

### **Enrolment**

Training in the Air Wing NCC is spread over three academic years, i. e. six semesters. The students who join the NCC are required to complete training for a minimum of four semesters. The authorised strength of Cadets is 200, who are equally divided into two flights.

During the academic year 1978-79, 100 students of First year B. Tech class were enrolled in NCC. The total strength of the Cadets was 200 at the beginning of the training session.

### **Training**

Keeping the aims of NCC in view training was imparted to the Cadets in accordance with the revised syllabus for Technical Air Squadrons issued by the Director General NCC. As part of the curriculum basic and advance Military training was also imparted. As part of the Technical training specialised subjects covered the two Technical branches of the Air Force Viz. Aeronautical Engineering (Mechanical) and Aeronautical Engineering (Electronics). Qualified Air Force instructors as well as NCC part time Officers imparted the necessary technical and Service training.



Training in Gliding was imparted to senior Cadets at Air Force Station, Tambaram. Aeromodelling training was conducted by a qualified Aeromodelling instructor. A large number of cadets showed keen interest in Aeromodelling. Firing practice in the skeet range using clay, pigeon trap and revolver shooting were also carried out.

### **Camp Training**

Annual Training Camp was held during the month of December/January 1978-79. Cadets from this Unit along with the cadets of sister units coming under NCC Group Headquarters Madras 'B' participated in the Camp. The camp was conducted in-side the IIT Campus, very close to the unit headquarters. The Cadets showed keenness in camp training and camp discipline.

Eight Cadets from this Unit attended the All India Vayu Sainic Camp held at Dodballapur near Bangalore from 11 June 79 to 24 June 79. Two Cadets and one part time NCC officer, FLT. Lt. V. Subramaniam attended Air Force attachment camp at No. 3 Base Repair Depot, Air Force Chandigarh from 18th June 79 to 14 July 79. They were given training in the various aspects of maintenance/overhaul of Military Aircraft and their components. Their stay with the Air Force Personnel has also given them an insight into the way of living under varying conditions of the Air Force Personnel.

### **Ceremonial Parades**

The Cadets of this Unit participated in a Guard of honour presented to the Hon'ble President of India, Shri Neelam Senjiva Reddy on 4 September 1978 in Engineering College, Guindy.

### **Certificate Examinations**

NCC certificate 'B' & 'C' Examinations were conducted in this unit in the month of March this year. 16 Cadets passed the 'B' certificate Examinations and 3 passed in 'C' certificate Examination. They deserve appreciation for their excellent performance.

### **Promise Day Parade**

The NCC promise is administered to all the Cadets on the Promise day Parade held every year during the Independence week in the month of August. Dr. E. G. Ramachandran Prof.- incharge (Special Assignment) IIT, took the salute during the Promise Day Parade held on 17 August 1978. He also administered the promise to all the Cadets. B and C certificates and various other camps and courses certificates were awarded to the successful cadets during the training year 1977-78.

# NAMES OF FACULTY MEMBERS, DEPARTMENT-WISE

## AERONAUTICAL ENGINEERING

### Professors

Dr. K. A. V. Pandalai  
„ A. K. Srikanth  
„ T. K. Bose  
„ N. R. Rajappa

Dr. K. A. Damodaran  
Prof. K. Balaraman  
„ C. S. Ballal

### Asst. Professors

Dr. R. M. Siddaveera Gowda  
„ G. Subramanian  
„ T. K. Varadan

Dr. S. Krishnan  
„ P. Venkateswarlu

### Lecturers

Sri E. G. Tulapurkara  
„ A. Krishnan

Sri S. Santha Kumar  
„ S. C. Rajan

## APPLIED MECHANICS

### Professors

Dr. N. V. Chandrasekharaswamy  
„ B. V. Aswathanarayana Rao  
„ R. S. Alwar

„ V. Ramamurti  
„ P. S. Srinivasan

### Asst. Professors

Dr. R. S. Srinivasan  
„ K. Motiram Patil  
„ T. M. Srinivasan

Dr. Megha Singh  
„ N. Ramjee  
„ A. S. J. Swamidos

### Lecturers

Dr. S. Venkatesan  
Sri M. Balakrishnan  
„ R. Krishna Iyer  
Dr. B. H. Lakshmana Gowda  
„ P. A. Aswathanarayana  
„ J. Ramachandran

Dr. S. Narayanan  
Sri S. Radhakrishnan  
„ G. Venkata Rao  
„ J. Lakshminarasimhan  
„ G. Bapaiah

**Design Engineer**

Dr. N. Ganesan

Dr. B. Srinivasa Prabhu

**Lecturer Gr. II**

Sri G. Thomas

**CHEMICAL ENGINEERING****Professors**

Dr. D. Venkateswarlu

„ T. Gopichand

„ M. Satyanarayana

„ Y. B. G. Varma

„ P. R. Krishnaswamy

**Asst. Professors**

Dr. M. Ramanujam

„ N. Subramanian

„ K. Remananda Rao

„ T. Venkataram

„ N. M. Raghavendra

„ G. S. Davis

Dr. M. S. Ananth

„ A. Prabhakara Rao

„ Ch. Durgaprasada Rao

„ R. Subramaniam

„ A. Baradarajan

„ U. R. Shettigara

**Lecturers**

Dr. N. Sankara Srinivas

„ R. Vedaraman

„ C. Chandra Prasad

Dr. T. K. Ramanujam

„ V. Srirama Chandra Rao,

Sri D. V. Seetharama Murthy

**CHEMISTRY****Professors**

Dr. J. C. Kuriacose

„ V. Srinivasan

„ G. Aravamudan

Dr. C. Narayana Pillai

„ P. T. Manoharan

**Asst. Professors**

Dr. Chatty Kalidas

„ V. Ramakrishnan

„ S. R. Ramadas

„ Surjit Singh

Dr. T. V. Ramakrishna

„ S. Subramanian

„ M. Ramakrishna Udupa

„ R. Narayan

Dr. C. S. Swamy  
 „ J. Rajaram  
 „ V. Mahadevan

Dr. K. Narayanan  
 „ M. S. Gopinathan

### Lecturers

Dr. M. Srinivasan  
 „ K. K. Balasubramanian  
 „ V. R. Satyanarayana Rao  
 „ D. V. Ramana  
 „ B. Viswanathan

Dr. R. Ramaswamy  
 „ C. S. Venkatachalam  
 „ C. R. Krishnamurthy  
 „ S. Vancheesan  
 „ T. K. Varadarajan

### Lecturers Gr. II

Sri N. Balasubramanian  
 „ N. Sundaram

Sri T. Subramanian  
 „ M. S. Subramanian

## CIVIL ENGINEERING

### Professors

Dr. K. S. Sankaran  
 „ P. Srinivasa Rao  
 „ D. Johnson Victor

Dr. L. N. Ramamurthy  
 Prof. S. C. Mitra  
 Dr. V. Satyanarayana Raju

### Asst. Professors

Sri R. L. Roy Choudhury  
 Dr. R. Radhakrishnan  
 „ T. P. Ganesan  
 „ Nainan P. Kurian  
 „ M. S. Subramanian  
 „ C. S. Krishnamurthy  
 „ V. Paramasivam

Dr. N. Rajagopalan  
 „ K. Elango  
 „ B. Ramanathan  
 Sri P. Sambandam  
 Dr. H. Suresh Rao  
 „ N. Jothi Shankar

### Lecturers

Sri V. D. Muthayya  
 Dr. Y. R. Nagaraja  
 „ P. Kalyanasundaram  
 „ H. Achutha  
 Sri K. N. Ramamurthy  
 „ D. Hariharan  
 Dr. K. Muthukrishnaiah

Dr. P. K. Aravindan  
 Sri K. Gopalakrishnan  
 Dr. Md. Mohideen  
 „ V. Dakshinamurthy  
 Sri T. C. Gopalakrishnan  
 Dr. V. R. Rangaraju  
 „ S. Dakshinamurthy

Sri N. R. Krishnaswamy  
 „ M. S. Mathew  
 Dr. S. Narasimha Rao

Dr. B. S. Thandevewara  
 Sri D. Raja Rao

### Lecturers Grade II

Sri S. Meenakshisundaram  
 „ V. G. Idichandy

Sri A. Ramachandraiah

## ELECTRICAL ENGINEERING

### Professors

Dr. P. Venkata Rao  
 „ M. Venugopal  
 „ V. G. K. Murti  
 „ M. K. Ahuthan  
 „ K. P. Rajappan  
 „ D. K. Banerjee

Dr. B. Ramaswamy  
 „ V. Seshadri  
 „ A. Kuppurajulu  
 „ Y. Narayana Rao  
 „ T. P. Raina

### Assistant Professors

Dr. C. Dattatreyan  
 „ V. V. Sastry  
 „ M. Mukunda Rao  
 „ V. V. Bapeswara Rao  
 „ P. Sankaran  
 „ G. Sridhara Rao  
 „ Vedam Subramanian  
 „ A. Chandrasekaran

Dr. P. Subbarami Reddy  
 „ C. Narayana Reddy  
 „ T. A. Ramalinga Bhat  
 „ K. Radhakrishna Rao  
 „ T. J. Vitto  
 „ J. P. Agarwal  
 „ S. Srinivasan

### Lecturers

Sri Varadarajan Subramaniam  
 Dr. S. S. Yegnanarayanan  
 „ B. S. Bhanumurthy  
 „ R. Parthasarathy  
 Sri M. Krishnamurthy  
 „ P. C. Majhee  
 „ G. T. Manohar  
 „ M. Anthony Reddy  
 Dr. P. Sashidhara Rao

Dr. V. C. V. Pratapa Reddy  
 „ M. V. Chalapathi Rao  
 „ C. Easwaran  
 „ P. A. Janakiraman  
 „ P. Karivaradarajan  
 Sri S. Yuvarajan  
 Dr. C. Venkataseshiah  
 Sri G. Govardhagiri Rao  
 „ K. Palaniswamy

**HUMANITIES AND SOCIAL SCIENCES****Professors**

Prof. R. K. Gupta  
Dr. V. Anantaraman

Dr. S. Ramani

**Asst. Professors**

Dr. A. V. Krishna Rao  
Sri V. S. N. Sarma  
Dr. L. V. L. N. Sarma  
Sri V. Arumugam

Sri E. Unnikrishnan,  
Dr. R. Rajagopalan  
Dr. (Mrs.) V. Hamsaleelavathy  
Dr. (Mrs.) Sakunthala Balaraman

**Lecturers**

Sri V. S. Kumar  
„ S. B. Djas  
„ S. G. Asthana  
Dr. C. Ramachandran

Sri Krishna Kumar Menon  
„ T. T. Narendran  
Mrs. Elizabeth Nainan Kurian  
Sri Durgaprasada Rao

**MATHEMATICS****Professors**

Dr. S. D. Nigam  
„ S. K. Srinivasan

Dr. L. V. K. V. Sarma  
„ K. M. Das

**Assistant Professors**

Dr. H. S. Paul  
„ R. Subramanian  
„ V. Subba Rao  
„ D. S. Subramanyan  
„ K. R. Parthasarathy  
„ Y. Nagendra

Dr. U. N. Srivastava  
„ P. Achuthan  
„ R. K. Jain  
„ P. Bhattacharya  
„ C. M. Purushotham

**Lecturers**

Dr. C. V. Raghava Rao  
„ S. N. Venkatarangam  
„ Surendranath Majhi  
„ T. S. Shankara

Dr. (Mrs.) S. Kalpagam  
„ A. Avudainayagam  
„ P. R. Parthasarathy

## MECHANICAL ENGINEERING

### Professors

Dr. B. S. Murthy	Dr. M. A. Parameswaran
„ M. C. Gupta	„ V. M. Krishna Sastry
„ V. C. Venkatesh	„ M. V. Krishnamurthy
„ H. C. Radhakrishna	„ V. Radhakrishnan
„ D. Prithviraj	„ H. Chandrasekaran
„ G. V. N. Rayudu	„ R. Natarajan

### Assistant Professors

Dr. K. Lakshminarayana	Dr. V. Sriramulu
„ R. S. Sirohi	„ K. N. Seetharaman
„ K. A. Bhaskaran	„ R. Raman
„ A. Ramamohana Rao	„ G. Gopalakrishnan
„ K. V. Gopalakrishnan	„ V. Seshagiri Rao
„ P. K. Philip	„ N. Venkatarayalu
„ T. Rajagopalan	„ M. Ravindran

### Lecturers

Sri K. S. Padiyar	Sri K. Narayanaswami
„ K. R. Govinda Mallan	„ V. Balabaskaran
„ V. N. Rajan	Dr. V. Ganeshan
„ K. N. Gopalan	Sri O. Venkata Krishnaiah. Chetty
„ D. V. Ramalingeswara Rao	„ S. Srinivasamurthy
„ A. Venkatesh	„ S. Kumaraswamy
Dr. M. P. Kothiyal	„ J. Fazlur Rahman
Sri K. V. Thiagarajan	„ K. Gopinath
Dr. P. Srinivasa Rao	„ G. Anjaneyalu
Sri K. V. Chalapathi Rao	„ D. Ganesh Kumar
Dr. M. Madhusudhana Rao	„ V. Venkateswara Rao
Sri U. S. Premananda Shet	„ Y. G. Srinivasa
Sri Vijay R. Raghavan	Dr. R. Krishnamoorthy
„ K. Ramakoteswara Rao	Sri G. Muthu Veerappan
Dr. B. Nagalingam	„ V. Jaya Prakash
Sri S. Rajesham	„ G. Kuppaswamy

### Lecturers Grade II

Sri S. Krishnamurthy

**METALLURGY****Professors**

Dr. E. G. Ramachandran  
 „ R. Vasudevan

Dr. K. Srinivasaraghavan  
 „ H. Md. Roshan

**Assistant Professors**

Sri R. K. Srikanta Kumaraswamy  
 Dr. V. Panchanathan  
 „ V. M. Radhakrishnan

Dr. S. Sundaresan  
 „ O. Prabhakar

**Lecturers**

Sri. S. Ramakrishna Iyer  
 Dr. K. J. Lakshminarayana Iyer  
 „ D. R. Gopalakrishna Achar  
 „ S. Prasanna Kumar  
 „ C. V. Gokulratnam  
 „ S. Raghavan

Sri R. N. Shency  
 „ P. Venugopal  
 „ S. D. Pathak  
 „ V. Jagasivamani  
 „ R. Kesavan Nair

**Lecturer Grade II**

Sri S. Kumaran

**PHYSICS****Professors**

Dr. C. Ramasastry

Dr. R. Srinivasan

**Assistant Professors**

Dr. B. V. Ramanamurthy  
 „ V. Sivaramakrishnan  
 „ C. K. Narayanaswami  
 „ J. Sobhanadri  
 „ S. Swaminathan  
 „ S. Bhimasankara Sastri

„ S. Radhakrishnan  
 „ Y. V. G. S. Murti  
 „ R. Ramji Rao  
 „ B. M. Sivaram  
 „ K. V. S. Rama Rao  
 „ G. Rangarajan

**Lecturers**

Sri V. Ramabhadran  
 Dr. K. Viswanatha Reddy  
 „ A. V. Narasimhan

Sri B. V. R. Chowdary  
 „ (Mrs.) Mahaseshasayee  
 „ V. Damodara Das



Sri B. Subrahmanyam  
 „ B. S. V. Gopalam  
 „ B.S.V.S. Ramachandra Charyalu  
 „ K. Srinivasan  
 „ V. Ramachandran

Sri G. Srinivasamurthy  
 „ S. Srinivasan  
 „ Jagabhandhu Majhi  
 „ Sriraman Srinivasan

### **Lecturers Grade II**

Sri K. Sarangapani  
 Kum. T. M. Vimala

Sri V. Subramanyamurthy  
 „ T. S. Natarajan

## **REGIONAL SOPHISTICATED INSTRUMENTATION CENTRE**

### **Senior Scientific Officer Grade I**

Dr. T. K. K. Srinivasan

## **OCEAN ENGINEERING CENTRE**

### **Professors**

Dr. V. S. Raju

Dr. C. Ganapathi

### **Assistant Professors**

Dr. M. R. Pranesh

Dr. A. S. J. Swamidas

### **Lecturers**

Dr. I. V. Muralikrishna

Dr. S. P. Subramanian

## **ENERGY RESEARCH CENTRE**

### **Assistant Professor**

Dr. S. Elangovan

## **FIBRE RE-INFORCED PLASTIC RESEARCH CENTRE**

### **Chief Design Engineer**

Dr. N. Gopalakrishnan Nair

### **Assistant Professor**

Dr. P. Palaninathan

### **Design Engineer**

Dr. S. K. Malhotra

Sri Jagadish Chandra Babu

**INDUSTRIAL CONSULTANCY CENTRE****Senior Techno Economic Officers**

Sri C. Sivaprasada Rao  
 „ P. N. V. Ramani

Sri R. Ambalavanan  
 „ Y. G. Narasimham

**Assistant Professor**

Dr. G. V. Subba Rao

**ENGINEERING DESIGN CENTRE  
 (Machinery Equipment)**

**Chief Design Engineers**

Sri T. S. Chennabasavan

Dr. M. A. Veluswami

**Senior Design Engineers**

Sir R. Ramachandran

Sri S. D. Kalander Saheb

**Senior Design Engineer (Systems)**

Sri Dev Kishore Sharma

**CENTRE FOR SYSTEMS & DEVICES****Professors**

Dr. D. Kakati

Dr. M. S. Narasimhan

**Assistant Professor**

Dr. V. Venkata Rao

**Lecturers**

Dr. K. Narayana Bhat

Sri M. C. Chandra Mouli

**Senior Scientific Officer**

Sri P. R. Vaya

**Senior Scientific Officer Grade II**

Sri Krishnan Kumar

**COMPUTER CENTRE****Professors**

Dr. H. N. Mahabala  
 „ C. R. Muthukrishnan

Dr. K. Thulasiraman  
 „ S. S. Srinivasan

**Assistant Professors**

Dr. R. Nagarajan  
 „ S. L. Mehndiratta

Dr. R. Kalyanakrishnan

**Manager (Systems)**

Sri S. Srinivasan

**Assistant Manager (Operations)**

Sri P. Seshasayee

**Senior Systems Programmers**

Sri M. Kothanda Ramanujan

Sri V. Aravamudan

**Programmers Grade I**

Sri Timir Kumar Basu

Sri R. Radhakrishna Pillai

„ N. Anantha Padmanabhan Thamby

**Shift Engineer**

Sri R. Deenadayalu

**Professors-in-charge**

Academic Programmes	:	Prof. M. C. Gupta
Research Programmes	:	Prof. S. K. Srinivasan
Engineering Unit	:	Prof. K. S. Sankaran
Industrial Consultancy Centre	:	Prof. V. C. Venkatesh
Special Assignments	:	Prof. E. G. Ramachandran
Students Affairs & Security	:	Prof. V. Anantaraman
Foreign students and weaker section students	:	Prof. J. C. Kuriacose
President, Institute Gymkhana	:	Prof. K. Balaraman

## NAMES OF STAFF MEMBERS DEPUTED ABROAD

### DURING THE YEAR 1978 - 79

Sri G. Jothinathan,  
Technical Assistant,  
Dept. of Metallurgy.

Sri N. Achuthan,  
Technical Assistant,  
C. S. D.

Sri G. Palaniswamy,  
Technical Assistant,  
R. S. I. C.

Sri Deepak Sur,  
Technical Assistant  
C. G. B. S.

Sri R. Kubendran,  
Technical Assistant,  
Central Photographic Section.

Dr. V. Seshagiri Rao,  
Assistant Professor,  
Dept. of Mechanical Engg.

Dr. T. P. Ganesan,  
Assistant Professor,  
Dept. of Civil Engg.

Dr. C. S. Krishnamurthy,  
Assistant Professor,  
Dept. of Civil Engg.

Dr. P. Srinivasa Rao,  
Lecturer,  
Dept. of Mechanical Engg.

Dr. S. Srinivasan,  
Lecturer,  
Dept. of Electrical Engg.

Dr. M. V. Chalapathi Rao,  
Lecturer,  
Dept. of Electrical Engg.

Dr. C. Ganapathy,  
Assistant Professor,  
Dept. of Civil Engg.

Dr. T. K. Bose,  
Professor,  
Dept. of Aeronautical Engg.

Dr. R. Vasudevan,  
Professor,  
Dept. of Metallurgy.

Dr. K. Elango,  
Assistant Professor,  
Dept. of Civil Engg.

Dr. M. V. Krishnamurthy,  
Professor,  
Dept. of Mechanical Engg.

Dr. M. Mukunda Rao,  
Assistant Professor,  
Dept. of Electrical Engg.

Dr. P. A. Janakiraman,  
Lecturer,  
Dept. of Electrical Engg.

Dr. S. Subramanian,  
Assistant Professor,  
Dept. of Chemistry.

Dr. V. M. Krishnasastri,  
Professor,  
Dept. of Mechanical Engg.

Dr. K. K. Balasubramaniam,  
Lecturer,  
Dept. of Chemistry.

Dr. M. Ramakrishna Udupa,  
Assistant Professor,  
Dept. of Chemistry.

Dr. C. Chandra Prasad  
Lecturer  
Dept. of Chemical Engg.

Dr. H. Md. Roshan  
Professor  
Dept. of Metallurgy.

Dr. R. P. Viswanath  
Senior Scientific officer  
Dept. of Chemistry.

Dr. K. A. Baskaran  
Assistant Professor  
Dept. of Mechanical Engg.

Sri. P. Sambandam,  
Assistant Professor,  
Dept. of Civil Engg.

Dr. H. Raman,  
Professor,  
Dept. of Civil Engg.

Dr. Nainan P. Kurian,  
Assistant Professor,  
Dept. of Civil Engg.

Dr. M. A. Parameswaran,  
Professor,  
Dept. of Mechanical Engg.

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*Statement of Accounts*

*1977-78*

INDIAN INSTITUTE OF  
RECEIPTS AND PAYMENTS ACCOUNT

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RECEIPTS

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<b>Opening Balance :</b>	Rs. 97,13,756
<b>Receipts on Capital Account</b>	
<b>Grant from Government of India on Capital Account</b>	63,50,000
<b>Other Capital Receipts :</b>	
<b>Refund of Custom Duty</b>	51,20,292

C/o

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2,11,84,048

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# TECHNOLOGY, MADRAS

FOR THE YEAR 1977-78

## PAYMENTS

<b>On Capital Account</b>	Rs.	Rs.
i. Works and Buildings		30,45,757
ii. (a) Equipment, Furniture and Fittings (Department)		
1. Chemistry	1,31,535	
2. Physics	93,117	
3. Mathematics	38,322	
4. Humanities & Social Sciences	27,868	
5. Civil Engineering	1,68,828	
6. Mechanical Engineering	3,27,207	
7. Electrical Engineering	3,28,339	
8. Chemical Engineering	2,02,758	
9. Metallurgy	1,12,152	
10. Applied Mechanics	1,61,306	
11. Aeronautical Engineering	2,10,216	
	<hr/>	18,01,648
(b) <b>Indigenous Capital Equipment :</b>		
T. V. Laboratory		35,754
(c) Central Services		61,321
<b>Research Centres</b>		
Engineering Design Centre	26,008	
Regional Sophisticated Instru- mentation Centre	31,308	
Composite Structures (FRP)	77,695	
Material Science Research Centre	69,510	
Energy Research Centre	27,114	
Inter-University Partnership Pro- jects	48,817	
Television Lab	32,523	
Centre for Rural Development	60,769	
	<hr/>	3,73,744
(d) Central Workshops		21,434
(e) Computer Centre		2,08,360
		<hr/>
	C/o	55,48,018



INDIAN INSTITUTE OF  
RECEIPTS AND PAYMENTS ACCOUNT

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RECEIPTS

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b/f	Rs.	Rs.
		2,11,84,048
<b>Grant from Government of India</b>		
On Revenue Account		3,27,02,000
<b>Receipt from Academic Sections :</b>		
Tuition Fees	4,00,719	
Hostel Seat Rent	1,72,090	
Gymkhana and Medical Fees	56,186	
Fines	6,163	
Examination Fees	46,545	
Degree in Absentia	4,131	
	<hr/>	6,85,834

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C/o

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5,45,71,882

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**TECHNOLOGY, MADRAS**  
**FOR THE YEAR 1977-78**

**PAYMENTS**

b/f	Rs.	Rs.
		55,48,018
<b>iii. Customs Duty on West German Equipments :</b>		
Customs Duty and Clearance Charges	71,47,982	
	42,443	
		71,90,425
<b>iv. Furniture and Fittings, Departments, Office, Library, etc.</b>		1,95,907
<b>v. Others :</b>		
Motor Vehicles		2,05,160
Cycles		1,507
Typewriters and Duplicators		64,597
Hospital Equipments		28,707
Telephones		2,220
Fire Fighting Equipment		—
<b>vi. Library :</b>		
(i) Books	2,53,354	
(ii) Journals and Back Volumes	6,98,060	
(iii) Equipments	48,102	
		9,99,516
<b>Revenue Account :</b>		
<b>Academic Sections-Pay and Allowances of Teaching Staff :</b>		
1. Chemistry	6,07,331	
2. Physics	5,73,545	
3. Mathematics	4,54,542	
4. Humanities & Social Sciences	3,75,637	
5. Civil Engineering	8,12,333	
6. Mechanical Engineering	11,71,614	
7. Electrical Engineering	11,00,253	
8. Chemical Engineering	4,65,267	
9. Metallurgy	3,84,693	
10. Applied Mechanics	4,60,295	
11. Aeronautical Engineering	3,71,839	
		67,77,349
		2,10,13,406
C/o		

INDIAN INSTITUTE OF  
RECEIPTS AND PAYMENTS ACCOUNT

**RECEIPTS**

	Rs.	Rs.
b/f		5,45,71,882
<b>Other Receipts</b>		
Application fees from students	3,18,407	
Application fees for posts in the Institute	3,803	
Admission fees	7,690	
Grade Card	4,971	
Gymkhana Receipts	497	
Institute Bus collection	2,09,835	
Hire Charges on Institute Vehicles	26,776	
Library Overdue Collections	29,264	
Institute Day and Association Fees	3,935	
	-----	6,05,178
<b>Interest</b>		
On Conveyance Advance	7,146	
On Security Deposits with Tamil Nadu Electricity Board	1,529	
On call deposits with SBI	3,18,511	
On other deposits (Endowments and National Plan Certificate)	6,126	
	-----	3,33,312
<b>Miscellaneous Receipts</b>		
Sale of Question Papers, Tender Forms Iron Scrap etc.	2,82,742	
Institute Contribution to CPF (Refund)	-	
Miscellaneous Recoveries	56,622	
Breakages from students	-	
Hire Charges for gowns	1,070	
Guest House Boarding Charges	11,920	
Subscription to Journal of Mathematical and Physical Sciences and sale proceeds of Institute Publications	46,945	
Migration Certificate	25	
Library Membership Fees	15,405	
Short Term & other Courses	1,68,795	
	-----	5,83,524
C/o		5,60,93,896

**TECHNOLOGY, MADRAS**

FOR THE YEAR 1977-78

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**PAYMENTS**

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	Rs.	Rs.
b/f		2,10,13,406
 <b>ii. Pay and Allowance for Non-Teaching Staff</b>		
1. Chemistry	2,80,518	
2. Physics	4,31,447	
3. Mathematics	24,406	
4. Humanities & Social Sciences	74,931	
5. Civil Engineering	4,43,553	
6. Mechanical Engineering	8,27,586	
7. Electrical Engineering	5,36,749	
8. Chemical Engineering	3,41,451	
9. Metallurgy	3,14,649	
10. Applied Mechanics	2,38,560	
11. Aeronautical Engineering	1,27,116	
	<hr/>	36,40,966
 <b>iii. Departmental Expenses</b>		
1. Chemistry	2,42,864	
2. Physics	1,24,918	
3. Mathematics	3,724	
4. Humanities & Social Sciences	13,908	
5. Civil Engineering	2,06,511	
6. Mechanical Engineering	3,46,515	
7. Electrical Engineering	2,79,539	
8. Chemical Engineering	2,56,106	
9. Metallurgy	1,81,083	
10. Applied Mechanics	2,00,917	
11. Aeronautical Engineering	1,33,290	
	<hr/>	19,89,375
Centre for Rural Development - Officers (Pay & Allowances)		32,267
Indo-German Project (Pay and Allowance)		1,20,419
		<hr/>
C/o		2,67,96,433

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INDIAN INSTITUTE OF  
RECEIPTS AND PAYMENTS ACCOUNT

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RECEIPTS

---

	b/f	Rs.	Rs.
<b>Receipts From Buildings :</b>			
Licence Fee		7,86,060	
Electricity, water and Services Charges		2,73,162	
		<hr/>	10,59,222
<b>Lawns and Gardens :</b>			
Usufructs & Sewage farm			22,261
Receipts from the Computer Centre			35,38,763
Central Photographic Section			25,232
General Stores			55,776
			<hr/>
		C/o	6,07,95,150

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TECHNOLOGY, MADRAS  
FOR THE YEAR 1977-78

PAYMENTS

	b/f	Rs.	Rs.
			2,67,96,433
<b>a. Library</b>			
Pay & Allowances (Officers)		67,281	
-do- Establishment		3,14,715	
Contingencies - Operating Cost		1,73,071	
Journal of General Interest		2,155	
Binding Charges		859	
			5,58,081
<b>b. Computer Centre</b>			
Pay & Allowances (Officers)		3,06,114	
Pay & Allowances (Others)		1,15,274	
Other Charges		13,49,875	
Payment to IBM for Non-qualifying usage		—	
			17,71,263
b. 1. Centres (Pay & Allowances) Officers		2,40,093	
2. Centres (Pay & Allowances) Establishment		2,43,117	
			4,83,210
<b>c. Central Workshops</b>			
Pay & Allowances of Officers		39,754	
-do- Other Staff		9,65,037	
Working Expenses (Instruments, tools & other consumables)		1,74,614	
Stipend for apprentices		55,482	
			12,34,887
<b>d. (i) Central Electronic Centre :</b>			
(Pay & Allowances)		69,653	
(ii) Air Conditioning Unit (-do-)		52,669	
			1,22,322
<b>e. Central Services Laboratory &amp; Research Centres</b>			
Special Instruments Laboratory (RSIC)		76,310	
Electron Microscope		1,713	
Electronic Instruments		26,361	
Servicing & Development Centre }			
Central Photographic Section		17,704	
Central Glass Blowing Section		12,638	
Air Conditioning Unit		49,782	
	C/o	1,84,508	3,09,66,196

INDIAN INSTITUTE OF  
RECEIPTS AND PAYMENTS ACCOUNT

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RECEIPTS

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b/f

6,07,95,150

C/o

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6,07,95,150

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**TECHNOLOGY, MADRAS**  
**FOR THE YEAR 1977-78**

**PAYMENTS**

	Rs.	Rs.
b/f	1,84,508	3,09,66,196
X-ray Defraction Laboratory	9,148	
Energy Research Centre	19,380	
Centre for Rural Development	34,160	
Programme on Engg. Education	—	
Fibre Reinforced Plastic Research Centre	24,492	
Television Engineering Lab.	4,510	
Engineering Design Centre	28,750	
Material Sciences Research Centre	57,891	
Indo-German Projects	97,085	
Indo-French Collaboration	3,216	
	<hr/>	4,63,140
<b>f. Institute Scholarships</b>		
Post graduate and Research	25,70,329	
Under Graduate	5,02,638	
	<hr/>	30,72,967
<b>g. N. C. C.</b>		
Pay and Allowances	49,792	
Other Expenditure	52,225	
National Service Scheme	12,279	
	<hr/>	1,14,296
<b>h. Athletic and Gymkhana</b>		
Pay and Allowances	13,368	
Other Expenditure	2,57,683	
	<hr/>	2,71,051
Part time lecturers	5,735	
Visiting Professors	9,825	
Technical Bulletin & Journals	36,444	
Symposia & Seminars	909	
Inplant Training/Courses/Visits	312	
Continuing Education Programme Organised by the Institute	92,923	
Quality Improvement Programme (Initiated by the Ministry of Education)	32,912	
Director's Laboratory	—	
Director's Discretionary Fund for Research	—	
Membership fees to outside bodies	5,450	
	<hr/>	
C/o	1,84,510	3,48,87,650



INDIAN INSTITUTE OF  
RECEIPTS AND PAYMENTS ACCOUNT

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RECEIPTS

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b/f

Rs.  
6,07,95,150

C/o

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6,07,95,150

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# TECHNOLOGY, MADRAS

FOR THE YEAR 1977-78

## PAYMENTS

	b/f	Rs.	Rs.	Rs.
Remuneration to External Examiners			1,84,510	3,48,87,650
Convocation			59,408	
Prizes for Academic Distinction			26,692	
Joint Entrance Examination			2,328	
Common Examination for Post-graduate Admission (CEPA)			2,63,578	
			1,38,101	6,74,617
<b>Hostels</b>				
Allowances to Wardens				12,603
<b>iv. Other Sections</b>				
<b>a. Central Administration</b>				
Pay and Allowances of Officers			2,94,930	
Pay and Allowances of other Staff			15,89,319	18,84,249
<b>b. Contingencies</b>				
Postage			1,51,839	
Entertainment			19,022	
Telephones			3,85,721	
Liveries			58,774	
Stationery			2,10,124	
Printing			54,248	
Advertisement			66,789	
Miscellaneous Expenses			2,82,328	12,28,845
<b>c. Other Items</b>				
Director's Discretionary Fund Payments			6,005	
Less Recoveries			4,827	1,178
<b>Stores</b>				
Pay & Allowances of Officers			21,311	
-do- Other Staff			2,12,331	2,33,642
<b>General Stores</b>				
Purchases		80,878		
Less issues		1,36,654		
Per contra		55,776		
				3,89,22,784
				C/o

INDIAN INSTITUTE OF  
RECEIPTS AND PAYMENTS ACCOUNT

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RECEIPTS

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b/f

Rs.  
6,07,95,150

C/o

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6,07,95,150

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# TECHNOLOGY, MADRAS

FOR THE YEAR 1977-78

## PAYMENTS

	b/f.	Rs.	Rs.
Security			3,89,22,784
Special Security Guards			1,93,855
<b>Lawns &amp; Gardens</b>			
Pay & Allowances of Horticultural Superintendent		16,743	
-do- Other staff		—	
Wages to Labourers, Purchase of seeds, etc.		2,32,759	
			2,49,502
Power			18,19,083
Water			3,57,139
Oil & Petrol			1,06,741
Repairs & Maintenance of Furniture			90,986
Duty Insurance and Road Taxes			17,563
Repairs & Maintenance Motor Vehicles			1,14,808
Fire Fighting Operation cost			4,737
<b>Works and Maintenance</b>			
Pay and Allowance of Officers		70,049	
do Other staff		5,49,134	
Other Expenditure on Maintenance		16,05,147	
			22,24,330
Property Tax			1,69,613
<b>Hospital</b>			
Pay & Allowances of Medical Officers		1,26,096	
Pay & Allowances Other staff		1,17,606	
Purchase of Medicines, etc.		2,95,136	
			5,38,838
Grant to Vanavani High School			500
Repairs & Maintenance of Typewriters & Duplicators			20,672
Audit Charges			12,800
Legal Expenses			17,586
Honorarium to Part Time Liaison Officer			6,000
			4,50,33,282
	C/o		

INDIAN INSTITUTE OF  
RECEIPTS AND PAYMENTS ACCOUNT

RECEIPTS

b/f	Rs.	Rs. 6,07,95,150
<b>Recovery of Advances</b>		
Motor Car and other Conveyances	57,810	
Festival Advances	98,822	
Customs Duty on Equipment from West Germany	73,11,028	
Customs Duty on Personal effects of West German Experts	4,34,936	
On account of UNESCO Coupons	20,447	
Miscellaneous Advances	6,26,876	
	85,49,919	
<b>Deposits</b>		
Suppliers' Deposits (Institute)	24,846	
Contractor' Deposits (Works)	8,08,740	
External Scholarships	5,68,167	
C. S. I. R.	6,44,888	
Students Caution Deposits	27,800	
Miscellaneous Deposits	29,88,021	
Quality Improvement Programme (Organised by Government of India) Centre for Systems & Devices (Defence Ministry) and Industrial Consultancy Work).	79,03,159	
	1,29,65,621	
<b>Centres</b>		
Grant from Government of India for Ocean Engineering Centre		46,00,000
C/o	Total	8,69,10,690

**TECHNOLOGY, MADRAS**  
**FOR THE YEAR 1977-78**

**PAYMENTS**

	b/f	Rs.	Rs.
<b>Travelling Allowances</b>			
Board of Governors		17,819	
Staff Committees, Selection Committees, etc.		29,956	
Candidates called for interview for appointment, etc.		26,012	
External Examiners		68,173	
Joint Entrance Examination		10,790	
		<hr/>	1,52,750
<b>Commitment under Indo-German Agreement</b>			
Customs Duty on Personal Effects of west German Experts		3,71,632	
Lodging Allowance to Experts		33,000	
Other Facilities		—	
		<hr/>	4,04,632
Contribution to Societies		—	
L. S. & P. C. on account of personnel on Foreign Service		9,039	
Contribution to Employees Welfare Scheme		19,056	
Training & Welfare Activities of staff members		4,021	
		<hr/>	32,116
Subsidy to Hostels due to revision of salary for Hostel Employees			3,68,675
<b>Provident/Fund/Gratuity/Pension</b>			
C. P. F. (Contribution & Interest)		1,10,000	
C. P. F. Cum-Gratuity (Contribution & Interest)		18,00,000	
G. P. F. Cum-Pension-Cum-Gratuity & Interest		30,000	
Gratuity & Pension		43,792	
		<hr/>	19,83,792
Industrial Research and Development Fund			17,00,000
<b>Advance Paid</b>			
Motor Car and Other Conveyance		97,632	
Festival Advances		95,800	
Customs Duty on Equipment from West Germany		45,59,326	
Customs Duty on Personal effects on West German Experts		1,85,673	
		<hr/>	<hr/>
	C/o	49,38,431	4,96,75,247

INDIAN INSTITUTE OF  
INCOME AND EXPENDITURE ACCOUNT

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EXPENDITURE

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b/f

Rs.  
8,69,10,690

Total

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8,69,10,690

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Sd/-  
*Finance & Accounts Officer, Indian Institute  
of Technology, Madras-36.*

TECHNOLOGY, MADRAS  
FOR THE YEAR ENDED 31-3-1978

INCOME		Rs.	Rs.
	b/f		
UNESCO Coupons		49,38,431	4,96,75,247
Other Miscellaneous Advance		—	
		3,85,605	
		<u>                    </u>	53,24,036
<b>Refund of Deposits</b>			
Supplier's Deposits (Institute)		23,954	
Contractors' Deposits (Works)		7,52,147	
External Scholarships		5,81,792	
C. S. I. R.		6,25,146	
Students Caution Deposits		14,150	
Miscellaneous Deposits		30,15,844	
QIP Programme Organised by Government of India, Centre for Systems & Devices (Defence Ministry and Industrial Liaison Work)		59,98,004	
		<u>                    </u>	1,10,11,037
<b>Centres</b>			
<b>Ocean Engineering Centre</b>			
Buildings & Construction		12,21,757	
Equipments		2,37,165	
Pay and Allowances		49,672	
Other working expenses		15,546	
For Establishment of Sub-Centres at other IITs.		5,33,200	
		<u>                    </u>	20,57,340
<b>Closing Balance</b>			
Cash on hand		1,31,123	
With State Bank of India		1,87,11,907	
		<u>                    </u>	1,88,43,030
Total	...		<u>                    </u> 8,69,10,690

Sd/-

Registrar, Indian Institute of Technology,  
Madras-36.

Sd/-

Director-In-Charge, Indian Institute of  
Technology, Madras-36.



INDIAN INSTITUTE OF  
INCOME AND EXPENDITURE ACCOUNT

**EXPENDITURE**

<b>Educational Expenses :</b>	Rs.	Rs.
<b>Pay of Teaching Staff</b>		
Department of Chemistry	6,07,169	
Physics	5,83,498	
Mathematics	4,58,037	
Humanities & Social Sciences	3,77,605	
Civil Engineering	8,17,365	
Mechanical Engineering	11,75,309	
Electrical Engineering	11,03,264	
Chemical Engineering	4,62,020	
Metallurgy	3,84,941	
Applied Mechanics	4,57,785	
Aeronautical Engineering	3,76,217	
Centres	2,52,789	
	<hr/>	70,55,999
<b>Pay of Non-Teaching Staff :</b>		
Department of Chemistry	2,81,591	
Physics	4,30,859	
Mathematics	24,574	
Humanities & Social Sciences	75,773	
Civil Engineering	4,45,587	
Mechanical Engineering	8,35,511	
Electrical Engineering	5,39,786	
Chemical Engineering	3,42,547	
Metallurgy	3,16,202	
Applied Mechanics	2,38,931	
Aeronautical Engineering	1,27,630	
Centres	2,55,512	
Indo-German Projects	1,24,558	
	<hr/>	40,39,071
C/o		<hr/> 1,10,95,070

**TECHNOLOGY, MADRAS****FOR THE YEAR ENDED 31-3-1978****INCOME****Grant from Government of India**  
(On Revenue Account)

	Rs.	Rs.
Regular Grant	3,19,17,000	
Ocean Engineering Grant	31,40,000	
	<hr/>	3,50,57,000

**General Income**

Tuition fees	3,96,881	
Hostel Seat Rent	1,70,489	
Gymkhana and Medical Fees	56,186	
Fines	6,164	
Examination Fees	46,545	
Degree in-absentia	4,131	
Application Fees from students	3,18,407	
Application Fees for Appointments	3,803	
Admission Fee	7,690	
Grade Card	4,971	
	<hr/>	10,15,267

**Miscellaneous Receipts**

Gymkhana	497	
Institute Bus Collection	2,09,962	
Hire Charges of Institute Vehicles	16,963	
Licence Fee	7,91,572	
Electricity, Water and Service Charges	2,72,907	
Lawns and Gardens (Auction Sale of Trees, Usufructs etc.)	22,261	
Other Receipts	7,83,634	
Income from the Computer Centre	32,39,538	
Central Photographic Section	25,232	
General Stores	32,976	
	<hr/>	53,95,542

C/o

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4,14,67,809

INDIAN INSTITUTE OF  
INCOME AND EXPENDITURE ACCOUNT

**EXPENDITURE**

b/f	Rs.	Rs.
		1,10,95,070
<b>Departmental Expenses</b>		
Chemistry	2,61,597	
Physics	1,34,535	
Mathematics	3,664	
Humanities & Social Sciences	14,163	
Civil Engineering	1,64,430	
Mechanical Engineering	2,98,812	
Electrical Engineering	3,63,598	
Chemical Engineering	2,37,672	
Metallurgy	1,89,457	
Applied Mechanics	2,45,954	
Aeronautical Engineering	1,38,492	
<b>Library</b>		20,52,374
<b>Pay and Allowances</b>		
Officers	67,680	
Establishment	3,13,201	
Contingencies - Operating cost	1,06,986	
Journals of General Interest	2,155	
Binding Charges	859	
<b>Computer Centre</b>		4,90,881
Pay and Allowances - Officers	3,08,428	
Pay and Allowances - Establishment	1,13,929	
Other Charges	13,21,877	
Industrial Research & Development Fund	16,07,632	
<b>Workshops</b>		33,51,866
Pay and Allowances of Workshop Superintendent	40,023	
Pay and Allowances of Other Staff	9,64,200	
Working Expenses (Instruments, Tools and other consumable)	1,68,691	
Stipend to Apprentices	57,982	
<b>Ocean Engineering Centre</b>		12,30,896
Pay and Allowances	49,672	
Working Expenses (Instruments & Other Consumables, etc.)	15,546	
Sub-Centre	5,33,200	
		5,98,418
C/o		1,88,19,505

TECHNOLOGY, MADRAS

FOR THE YEAR ENDED 31-3-1978

**INCOME**

b/f

Rs.  
4,14,67,809

C/o

4,14,67,809

INDIAN INSTITUTE OF  
INCOME AND EXPENDITURE ACCOUNT

**EXPENDITURE**

	b/f	Rs.	Rs.
<b>Central Services Laboratory and Research Centres</b>			1,88,19,505
Energy Research Centre		19,380	
Centre for Rural Development		33,862	
Programme for Engineering Education		—	
Regional Sophisticated Instrumentation Centre		88,218	
Electron Microscope		5,041	
Electronic Instruments Servicing and Development Centre		26,054	
Central Photographic Section		17,622	
Central Glass Blowing Section		11,614	
A. C. Unit		25,482	
X-ray Defraction Unit		10,587	
Fibre Reinforced Plastic Research Centre		69,067	
Television Engineering Lab.		4,510	
Engineering Design Centres		25,836	
Material Sciences Research Centre		57,989	
Indo-German Project		97,085	
Indo-French Collaboration		3,215	
Pay and Allowances - Centre For Rural Development - Officers		_____	4,95,562
Pay and Allowances - Central Electronic Centre			32,580
			69,922
Pay and Allowances-Air-Conditioning Unit			51,709
<b>Institute Scholarships</b>			
Post - Graduate and Research Under Graduate		26,02,854	
		4,79,098	
		_____	30,81,952
<b>N. C. C.</b>			
Pay and Allowances		47,820	
Other Expenditure		51,762	
National Service Scheme		12,279	
		_____	1,11,861
<b>Athletic and Gymkhana</b>			
Pay and Allowances		13,754	
Other Expenditure		2,57,563	
		_____	2,71,317
			_____
C/o			2,29,34,408

TECHNOLOGY, MADRAS

FOR THE YEAR ENDED 31-3-1978

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INCOME

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b/f

Rs.  
4,14,67,809

C/o

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4,14,67,809

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**INDIAN INSTITUTE OF  
INCOME AND EXPENDITURE ACCOUNT**

**EXPENDITURE**

	Rs.	Rs.
b/f		2,29,34,408
Part-time Lecturers	5,735	
Visiting Professors	9,605	
Technical Bulletin and Journals	36,444	
Symposia and Seminars	909	
Inplant Training/Courses/Visits	312	
Continuing Education Programme Organised by the Institute	92,923	1,45,928
Quality Improvement Programme initiated by the Ministry of Education	32,912	
Director's Laboratory	—	
Director's Discretionary Fund for Research	—	
Membership fees to outside bodies	5,450	
Joint Entrance Examination	2,63,578	
Remuneration to External Examiners	59,408	
Convocation	26,692	
Prizes for Academic distinction	2,328	
Common Examination for P.G. Admissions	1,38,101	
	-----	5,28,469
<b>Hostels</b>		
Allowances to Wardens		14,017
<b>Central Administration</b>		
(Pay and Allowances) Officers	2,95,088	
Establishment	15,99,989	
	-----	18,95,077
<b>Contingencies</b>		
Postage	1,56,573	
Entertainment	19,022	
Telephones	3,85,721	
Liveries	51,675	
Stationery	1,74,667	
Printing	54,732	
Advertisement	73,131	
Sundries (Miscellaneous Expenses)	2,82,200	
	-----	11,97,721
<b>Other Items</b>		
Director's Discretionary Fund		1,178
General Stores		—
		-----
C/o		2,67,16,798

TECHNOLOGY, MADRAS

FOR THE YEAR ENDED 31-3-1978

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INCOME

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b/f

Rs.

4,14,67,809

C/o

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4,14,67,809



**INDIAN INSTITUTE OF  
INCOME AND EXPENDITURE ACCOUNT**

**EXPENDITURE**

b/f	Rs.	Rs.
<b>Stores</b>		2,67,16,798
Pay and allowances-Officers	21,406	
Pay and allowances of Establishment	2,12,640	
	<hr/>	2,34,046
Security		1,97,787
Special Security Guards		1,77,745
<b>Lawns and Gardens</b>		
Pay and Allowances of the Horticultural Superintendent	16,865	
Pay and Allowances of the Horticultural Supervisor	—	
Wages to Labourers, Purchase of Seeds etc.	2,34,055	
	<hr/>	2,50,920
<b>Power</b>		18,85,747
Water charges		3,57,139
Oil & Petrol		1,05,651
Repairs and Maintenance of Furniture		88,936
Duty, Insurance and Road Taxes		17,563
Repairs and Maintenance-Motor vehicles and Cycles		1,06,693
Fire fighting-Operating cost		4,737
<b>Works and maintenance</b>		
Pay and Allowances of Officers	70,512	
Pay and Allowances of Establishment	5,51,218	
Other Charges	16,05,147	
	<hr/>	22,26,877
Property Tax		1,69,613
<b>Hospital</b>		
Pay and Allowances of Medical Officers	1,32,687	
Pay and Allowances of Establishment	1,18,435	
Purchase of Medicines	3,23,599	
	<hr/>	5,74,721
C/o		<hr/> 3,31,14,973

TECHNOLOGY, MADRAS

FOR THE YEAR ENDED 31-3-1978

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INCOME

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b/f

Rs.  
4,14,67,809

C/o

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4,14,67,809

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**INDIAN INSTITUTE OF  
INCOME AND EXPENDITURE ACCOUNT**

**EXPENDITURE**

	Rs.	Rs.
b/f		3,31,14,973
Grant to Primary School		500
Repairs & Maintenance of Typewriters & Duplicators		21,030
Audit Charges		12,800
Legal Expenses		17,586
Honorarium to Legal Adviser		—
Honorarium to Part Time Liaison Officer		5,500
<b>Travelling Allowances</b>		
Board of Governors	17,819	
Selection Committee, Senate Etc.	29,956	
Candidates called for interview	26,012	
External Examiners	68,174	
Joint Entrance Examination	10,790	
	1,52,751	
<b>Commitments under Indo-German Agreement</b>		
Customs Duty on Personal effects to West German Experts		3,71,632
Lodging Allowances to West German Experts		33,000
Subsidy to Hostels due to revision of salary to Hostel employees		3,68,675
Employees Welfare Scheme		19,056
L. S. & P. C. on account of personnel on Foreign Service		9,039
Training & Welfare Activities of Staff Members		4,021
G.P.F. Contribution etc.		19,35,319
Cost of Stores lost, damaged or rendered Unservisable, written off		12,565
Excess of income over expenditure		53,89,362
	<b>Total :</b>	<b>4,14,67,809</b>

Sd/-  
*Finance & Accounts Officer, Indian Institute of  
Technology, Madras 600 036.*

TECHNOLOGY, MADRAS  
FOR THE YEAR ENDED 31-3-1978

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INCOME

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b/f

Rs.  
4,14,67,809

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Total : 4,14,67,809

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Sd/-  
*Registrar, Indian Institute of Technology,  
Madras 600 036.*

Sd/-  
*Director, Indian Institute of Technology,  
Madras 600 036.*

INDIAN INSTITUTE OF  
BALANCE SHEET AS

**CAPITAL FUNDS AND LIABILITIES**

	Rs.	Rs.	Rs.
<b>Capital Fund</b>			
Value of Land per contra		1,00,97,262	
Block Value of German aid per contra			
—Equipments	8,57,28,713		
Technical Books and Journals per contra	12,91,840		
		8,70,20,553	
<b>Computer systems per contra</b>			
As per last Balance sheet		1,54,50,458	
<b>Block value of Gift from USA</b>			
Analogue Computer per contra		2,28,100	
Capital grants and balance of Income & Expenditure account as on 31-3-1977	14,05,61,754		
Add: Capital grant during 77-78	78,10,000		
Add: Excess of Income over Expenditure for the year 1977-78	53,89,362		
		15,37,61,116	
Gymkhana Fund			26,65,57,489
Endowment Fund (Governor's Prizes, etc.)			49,811
			1,33,350
<b>Deposits</b>			
Earnest Money, Caution and other Deposits			1,15,16,990
<b>Sundry Creditors</b>			
On Works Account		2,60,237	
For Supplies made or services rendered to Depts./Sections		4,92,738	
			7,52,975
<b>Outstanding Expenses Payable</b>			
(a) Pay and Allowances			13,77,863
(b) Scholarships			2,59,934

C/o

28,06,48,412

# TECHNOLOGY, MADRAS

AT 31-3-1978

## PROPERTY AND ASSETS

	Rs.	Rs.	Rs.
<b>Land</b>			
Value of land gifted by the Govt. of Tamil Nadu			1,00,97,262
<b>Buildings</b>			
Cost of Completed Buildings as on 31-3-1977	8,08,35,713		
Add : Buildings completed during the year	36,40,436	8,44,76,149	
Buildings under Construction as on 31-3-1977	7,37,831		
Add : Expenditure for the year	42,87,124		
	50,24,955		
Less: Transferred to completed Buildings account	36,40,436	13,84,519	8,58,60,668
Diesel Generator			2,14,232
<b>Equipments Furniture &amp; Fittings</b>			
At cost as per Balance Sheet as at 31-3-1977	2,41,90,503		
Add : Additions during the year	31,64,065	2,73,54,568	
Less: Cost of equipment written off during the year		12,565	
Computer acquired through German Food Aid Funds under the Indo-German Agreement			1,54,50,458
At cost as per Balance Sheet as on 31-3-78			
Value of Analogue Computer received as gift from USA (Tools for freedom) per contra		2,28,100	
Add : Customs Duty, Insurance etc.		11,044	
			2,39,144
			13,92,03,767
	C/o		

INDIAN INSTITUTE OF  
BALANCE SHEET AS

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CAPITAL FUNDS AND LIABILITIES

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	Rs.
b/f	28,06,48,412
(d) Other Allowances - Medical	28,394
(e) wages to NMR Labourers - Departments etc	24,237
(f) Audit fees	12,000
(g) C. P. F. Contribution Payable	—
(h) Visiting Professors	160
(i) Outside Hour Operations	21,000
(j) Stipend to Apprentices	2,500
<b>Excess Fees Refundable</b>	
Fees refundable on account of Scholarship and Freeship as on 31-3-78	4,769
<b>American Chemical Society</b>	
<b>Account with First National City Bank New York Account (A)</b>	
Balance as per last year Balance Sheet	1,10,934
C/o	28,08,52,406

TECHNOLOGY, MADRAS

AT 31-3-1978

PROPERTY AND ASSETS

	b/f	Rs.	Rs	Rs.
				13,92,03,767
Block Value of equipment from West Germany as per Balance Sheet as on 31-3-1977		8,04,91,830		
Add: Addition during the year		<u>52,36,883</u>	8,57,28,713	
Customs duty and Clearance charges on equipment from West Germany as per Balance Sheet on 31-3-1977		1,59,67,026		
Add: Customs Duty paid during the year		<u>20,76,666</u>	1,80,43,692	10,37,72,405
Motor Vehicles at cost as per Balance Sheet as at 31-3-1977			6,16,348	
Add: Additions during the year			<u>2,05,160</u>	8,21,508
Library Books and Scientific Journals at costs as an 31-3-1977			71,81,830	
Add: Additions during the year			<u>9,47,915</u>	81,29,745
Block value of technical Books, Journals from West Germany as per Balance Sheet as at 31-3-77			11,10,002	
Add: Addition during the year			<u>1,81,838</u>	12,91,840
Typewriters and Duplicators at cost as per Balance Sheet as at 31-3-1977			3,77,411	
Add: Addition during the year			<u>64,608</u>	4,42,019

C/o

25,36,61,284



INDIAN INSTITUTE OF  
BALANCE SHEET AS

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CAPITAL FUND AND LIABILITIES

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	Rs.
b/f	28,08,52,406
Unpaid items as on 31-3-1978 as per undisbursed pay Register	41,537

C/o

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28,08,93,943

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**TECHNOLOGY, MADRAS**

AT 31-3-1978

**PROPERTY AND ASSETS**

b/f	Rs.	Rs.
Tools and Plants works as at 31-3-1977	2,78,788	25,36,61,284
Add: Additions during the year	23,522	
	<hr/>	3,02,310
Cycles at cost as per Balance Sheet as at 31-3-1977	23,493	
Add: Additions during the year	1,506	
	<hr/>	24,999
Investment Account, Endowment Fund, Governor's Prize etc. as on 31-3-78		1,33,350
<b>Stock as on 31-3-1978</b>		
Consumable Stores with Department		15,62,974
Construction materials with Engineering Unit works Account		10,27,154
Guest House Provisions		338
Stationery Articles		1,10,000
Consumable Stores & Liveries with Central Stores		29,820
Tyres, Tubes, Spare parts etc.		55,051
UNESCO Coupons		63,287
Gymkhana Assets (Projector and Tape Recorder at cost as per last year Balance Sheet)		49,811
Fees recoverable		22,832
Licence fee etc. recoverable		23,185
Taramani House Boarding charges recoveries		5,061
		<hr/>
C/o		25,70,71,456

INDIAN INSTITUTE OF  
BALANCE SHEET AS

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CAPITAL FUND AND LIABILITIES

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b/f

Rs.  
28,08,93,943

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Total: 28,08,93,943

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NOTE: Value of 44.80 acres of land received as gift from Tamil Nadu Government Balance Sheet.

Sd/- A. V. K. NAMBIAR  
*Finance & Accounts Officer*

TECHNOLOGY, MADRAS

AT 31-3-1978

PROPERTY & ASSETS

	b/f	Rs.
		25,70,71,456
Income receivable for the Computer Centre		5,16,036
I. R. D. F.		36,510
Hire Charges of Institute Vehicles etc. recoverable		20,220
Stamps on hand		11,700
C. P. F. Contribution recoverable		1,55,869
C. P. F. Interest on bonds recoverable		93,600
Payments from grant received from the American Chemical Society Equipment as on 31-3-1978		1,10,934
<b>Advance and Deposits</b>		
Works Advance		5,66,640
Other (General)		18,33,211
<b>Deposits With</b>		
T. N. S. E. B.	4,50,107	
Collector of Customs-Account I	10,83,526	
Collector of Customs-Account II	59,067	
	<u>15,92,700</u>	
<b>Unpaid Balance (per contra) with State Bank of India in 'C' Account.</b>		
Cash on hand	41,537	
<b>Closing Balance</b>		
Cash on hand	1,31,123	
Office Imprest Cash	500	
With State Bank of India	1,87,11,907	
	<u>1,88,85,067</u>	
<b>Total :</b>		<u>28,08,93,943</u>

remains to be assessed and included in the value of land shown at the first page of this

Sd/- R. S. VIRMANI  
Registrar

Sd/- E. G. RAMACHANDRAN  
Director In-Charge