ANNUAL REPORT

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BIRLA INSTITUTE OF TECHNOLOGY
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I N D E X

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DIRECTOR'S NOTE

The year 1992-93 has been a period of rewards and hopes for further growth and development of this Institute. Besides several academic innovations and achievements in the fields of R&D, Consultancy, Institute-Industry-Interaction and special programmes have been significant; while honours and awards for academic excellence have been conferred upon some of our Faculty, it is significant to place on record that one of our young scholars - Shri Nayar who had successfully built a Robot at the Department of Electrical Engineering has been awarded a prestigious Development grant of $ 5,00,000 from an International Science Foundation for development of special purpose sensors for Robot.

In time with the Philosophy and objective of the Institute of imparting research-oriented instruction and integrated research and training programmes, the students, both at the Under-graduate as well as Post-graduate levels, have been involved in different kinds of live-projects from the surrounding Industries.

The research scene at the Institute continues to be encouraging. It is being supported by the Post-graduate and Post-Doctoral Courses offered in almost all branches. Several papers have been published, experimental models and prototypes have been developed.

The Institute has established close interaction with Industry. In collaboration with the H.E.C., SAIL (R&D), Central Coalfields (India), C.M.P.D.I., ISRO, Birla and Tata Groups of Industries; works on several R & D Projects have been successfully accomplished. A brief account of the Projects already completed during the year under report and those on which work is in progress is given in Chapter 7 - 'Academic Innovations, Research & Development' (Pages 17 to 35).

The STEP (Science & Technology Entrepreneurs Park) programme of the Institute continues to serve as a national

'Model' of entrepreneurship development. Under this programmes, senior students are involved in developing scientific equipments or components. Faculty also assists and encourages the students to develop indigenous substitutes of imported items. The resultant know-how led to the establishment of a number of useful and viable manufacturing units owned and run by young Techno-Entrepreneurs.

The Institute is continously updating its curriculum. While dropping some routine-type courses, new courses in the Emerging Technology areas such as CAD/CAM, Robotics, Plasma, Energy Conversion, Remote Sensing and Environmental Engineering have been included with a view to broadening the horizons of young scholars. Ours is the first institution in the region to introduce Post-graduate programmes in (i) Bio-medical Instrumentation, (ii) Information Science and (iii) Hospital Administration. Also M.Tech. level programme in Automated Manufacturing Systems is also being provided to the sponsored teachers group from Bihar State. The Institute has finalised a blue-print for introducing new programmes in (i) M.Tech. Computers (ii) M.Sc. Electronics (iii) M.Pharm. in Pharmacognosy and Pharmacology and (iv) B.E. Polymer Engg. The Proposals are in process for screening approval of the appropriate professional bodies and the Board of Post-graduate Studies, Government of India. The approval of AICTE for introducing B.Arch. (5-Yr.) Course has been received and the Course will be introduced from the academic session 1993-94.

Keeping in view the acute shortage of power in Bihar, particularly in the Chhotanagpur region, the Institute is exploring the possibility of setting up a Power Plant from non-conventional sources like mini hydel power, solar thermal, bio-mass etc. Discussion with the State Official regarding this is continuing.

The Institute has got a well equipped Solar Energy Laboratory. Research and development work in various sub-areas of Solar Energy is in progress. The Institute is establishing Solar Pond Research Station with the financial assistance from Bihar Renewal Energy Development Agency. The Solar Pond is ready for charging. Solar Instruments have been installed at the Pond site and Solar data collection is being done. In the next phase, power generation with the help of solar vapour turbine will be taken up.

The constructions of a new block of Institute Library, Institute Hospital and new Girls' Hostel have been completed. The construction work on Research & Development Building and improvement of Play Grounds are under progress.

With the unbounded support and guidance of the Chairman, the Vice-Chairman and the statutary authorities of the Institute and co-operation of the faculty and students, the Institute has been able to foster phenomenal growth and progress. The Institute is proud to mention its high academic standards and discipline. Here it is pertinent to place on record the findings of a survey published in May 1993 in the Economic Times which ranks B.I.T., Mesra, as a top-ranking Technological Institute in the country after IITs.

It is hoped that with encouraging support of the Central and State Government and continued guidance of the Board, Institute will attain greater heights of excellence.

B.I.T., Mesra, Ranchi
Dated: June 30, 1993.

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ADMINISTRATION

B.I.T. is a 'deemed University' under sec. 3 of the UGC Act, 1956. It functions under the overall supervision, direction and control of a high-power Board of Governers, comprising representatives of the Ministry of Education, Govt. of India, the UGC, the State Govt., the Chancellor, the AICTE, the Trust and the Institute Faculty. Mr. G. P. Birla is the Chairman of the Board of Governors. The Governor of the State of Bihar is the Chancellor of the Institute. Composition of the Board of Governors is given in Annexure - I.

The Technical Council decides the academic policy of the Institute. It controls and approve the curriculum, courses and examination results. It appoints Committee to look into specific academic matters arising from time to time. The teaching, training and research activities of various departments at the Institute are constantly under review to improve both facilities and standards. The Director of the Institute is the Chairman of the Technical Council. Members of the Technical Council are listed in Annexure - II.

Financial advice to the Institute is given by the Finance Committee whose constitution is given in Appendix II. Similarly, the Building and Works Committee advises the Institute in matters relating to building works activity. The constitution is also given in Annexure - II.

In addition there are a number of other committees like the Regulation Committee for Under-graduate and Post-graduate courses, examination Committee, Semester Programme Co-ordination Committee, Admission Committee, Scholarship Committee, Students' Welfare Committee etc. which are appointed by the Technical Council to help the administration in the efficient running of the Institute.

GENERAL REVIEW

BRIEF HISTORY

The Institute was established as an All India Institute for imparting Technical Education and Research in 1955 by the Hindustan Charity Trust. Initially it functioned as an affiliated college of the erstwhile Bihar University and later in 1960 upon creation of new Universities in the State, its affiliation was transferred to the Ranchi University.

In pursuance of the recommendations of the Education Commission, Government of India (1964-66) and on the basis of the report of a Joint Selectn.Committee of the UGC and AICTE, in March, 1972 the Institute was granted the status of an 'Autonomous' College by making special provision in Bihar State Universities Act. The Rules for its governance were made by the Chancellor of the Universities of Bihar.

On the basis of its continued excellence, and approval by the UGC, the Institute was declared a "Deemed University" in August 1986 under Section 3 of the UGC Act.

Since its inception the Institute is updating its academic standards, and has now acquired a pride of place in Technical Education and is one of the Premier Institute in Eastern India.

COURSES & DEGREE PROGRAMMES

Currently it is offering a variety of curricular programmes as detailed below:

Course	Intake capacity	Duration of course	Year of introduction of the course
1. BACHELOR OF ENGINEERING			
1. Civil	45	4 years course	1957
2. Computer Science	30	-do-	1983
3. Electrical & Electronics	45	-do-	1955
4. Electronics & Coomunication	60	-do-	1964
5. Mechanical	60	-do-	1955
6. Production	30	-do-	1964
II. PHARMACEUTICAL SCIENCES			
1. B.Pharmacy	30	-do-	1972
2. M. Pharmacy	10	3 Semester or 1.½ years	1983
(i) Pharmaceutical Chemistry (ii) Pharmaceutics			
III. MASTER OF ENGINEERING			
1. Civil	2	-do-	1965
Soil Mechanics Structural & Foundation Engg.			
2. Electrical	12	-do-	1964
(i) Control System & (ii) Power System			
3. Electronics & Communication	12	-do-	1965
(i) Instrumentation (ii) Microwave Engineering			
4. Mechanical	6	-do-	1964
Heat Power Engineering			
5. Space Engineering & Rocketry	10	-do-	1965
(i) Rocket Propulsion & (ii) Aerodynamics			
IV. MASTER OF SCIENCE			
Bio-Medical Instrumentation	15	2 years	1992

Course	Intake Capacity	Duration of Course	Year of introduction of the course
V. COMPUTER APPLICATIONS:			
(a) Master of Computer Applications	30	3 Years	1984
(b) Diploma in Computer Applications	30	1 Year	1988
VI. BUSINESS ADMINISTRATION:			
(a) Master of Business Admn. with specialisatiion in: (i) Marketing, (ii) Finance, (iii) Systems and (iv) Industrial Management	30	2 Year	1980
(b) Diploma in Business Admn.	30	1 Year	1982

VII. DOCTOR OF PHILOSOPHY:

The Institute offers Research Programmes leading to Ph.D. Degree in all the above disciplines.

Note : Additional programmes for Under-graduate Degree Course in Architecture and for Post-graduate Course in Information Science will commence from the next academic session.

VIII. CONTINUING EDUCATION (PART-TIME) POST-GRADUATE PROGRAMME:

To enable Working Engineers to update their technologies, the part-time Post-graduate Programme offers 3 levels:

A Certificate of Merit after completing 5 units

A Diploma after completing 10 units and

A Degree after completing 15 units of course work.

The disciplines are:

1.	Civil Engineering	: Structural Design
2.	Computer Applications	: -
3.	Electrical Engineering	: Control System & Power System.
4.	Management	: Marketing, Personnel, Industrial Management, Finance and Systems.
5.	Mechanical Engineering	: Design of Mechanical Equipment.
6.	Production Engineering	: Industrial Automation.

ENROLMENT

There are 1775 students who have enrolled during the current Academic Year 1992-93. The Branch-wise enrolment is detailed below. Of these there are 191 girl students and 79 foreign students:

	Full Time	Part Time	
B.E.	1295	-	
B.Pharm.	113	-	
M.C.A./D.C.A.	83	40	
M.B.A.	57	40	
M.Pharm.	20	-	
M.E.	64	63	
	1632	143	= 1775

FACULTY & STAFF

Against the sanctioned strength of 173 Faculty positions, 148 are filled with 25 vacancies. The break-up is as follows:

Category	Sanctioned Strength	In Position	Vacancies
Professors	50	43	7
Associate Professors	55	39	16
Lecturers/Associate Lecturers	68	66	2
	173	148	25

The number of administrative and supporting staff are approximately 250. In addition, there are about 300 Class-IV Staff to look after the General Maintenance of electricity, water supply, Gardens, Security, Hostels and allied services. It may also be mentioned that under the Welfare Programme for the weaker sections of society specially from villages adjoining the Institute Campus, the Institute has engaged about 150 persons as Trainees/ Apprentices in various technical and other trades. While under training these persons are paid some allowance/stipend on a regular monthly basis and they are absorbed in regular posts against vacancies arising, from time to time.

All academic staff have been provided accommodation on the Campus.

About 60% of the administrative and other supporting staff have also been provided accommodation on the Campus.

CAMPUS AND PHYSICAL FACILITIES

The Institute is fully residential and extends over 780 acres. The main buildings of the Institute covers an area of over 30,000 sq. mtrs. and accomodates the various research and training laboratories, administrative offices, lecture rooms. The Workshop annexe has a covered area of 4,000 sq. mtrs. The laboratories and offices of the Department of Space Engineering & Rocketry are situated for security reasons in a sub-campus, about half a kilometer away.

For the convenience of working Engineers to participate in Post-graduate programmes a technology Centre was established in Ranchi City at Lalpur in 1976.

The campus is self contained amidst well laid lawns, with its own protected water supply, marketing centre, dispensary, bank and schools.

II. Description of Buildings on the Institute

1. Institutional Buildings	Sq.mtrs.
i) Main building & Administrative Block	3700
ii) Class room and laboratories, Drawing Halls, Staff rooms etc.	9300
iii) Library Block	2600
iv) Space Engg. & Rocketry Block including explosive and Rocket Fuel Centre	930
v) Workshop Sheds, General Stores, Garrage/Godown	3721
vi) Gymnasium	850

2. Others	Sq.mtrs.
i) Animal House	400
ii) NCC Block	400
iii) Primary/High School (temporarily housed in Mechanical Engg. Block	744

Note: During the year 1987-88 a Navodaya Vidyalaya has also been established in the Institute campus. Presently it is housed in temporary sheds constructed for the purpose. The work of construction of Navodaya Vidyalaya Complex is in progress.

III. Residential Complex

i) Staff Quarters in different categories	300
ii) Residential Complex for supporting services: Forest Guards, Diary, Shop Keepers, Washermen etc.	70

IV. Hostels

i) Seven Boy's Hostels	1450 Single Rooms
ii) One Girls' Hostel	60 Rooms
iii) One Foreign Students' Hostel	32 Rooms

Note: Another Girl's Hostel of 80 rooms is nearing completion and will be ready for use from the academic session 1993-94.

V. Guest accommodation

The Institute maintains two Guest Houses. A General purpose Guest House with 8 furnished rooms and a VIP Guest House with 3 deluxe double bed-rooms to accommodate guests appropriately.

VI. Auditorium

To meet the growing needs of the community for public functions an Open Air Theatre is partly completed and can seat 2500.

There is also a Mini-Auditorium with seating capacity of 450 in the main Administrative Block.

VII. Games & Sports

The Institute has a Gymnasium and is spacious enough to accommodate indoor games. Extensive play grounds are provided to facilitate sports. They are:

1.	Field Tracks for Sports/Atheletics/ Cricket.	-1
2.	Football ground	-2
3.	Hockey grounds	-2
4.	Basket Ball grounds	-4
5.	Volley Ball grounds	-6
6.	Tennis Courts	-6
7.	Badminton Courts	-6(1 indoor court)
8.	Rifle Firing Range	-1
9.	NCC Parade ground	-1

VIII. Canteen services

A Moderately furnished canteen, provides snacks for students and staff.

IX. Dispensary-cum-Health Unit

A eight bed health care unit serves the large campus community mainly as an outdoor patient unit. This unit supports three full time doctors. Excellent rapport exists for acute medical needs with the Government Medical College Hospital at Ranchi. The construction of the new Hospital building is nearing completion.

X. Marketing Centre

A well run Cooperative Stores provide the daily requirements of the campus of nearly 5,000 residents. Additional shopping complex is provided for sundry needs.

We hope to establish a full fledged marketing centre and cooperative Book Store to meet the growing needs of the campus. The annual needs exceeds Rs. 2 crore mark. The construction of Marketing Complex is in progress.

CENTRAL SERVICES

COMPUTER CENTRE

Computer Centre provides the central facility for the students and staff members of this Institute. It started on a modest scale with PDP-11/34 Mini computer from D.E.C., U.S.A. in 1982 and has upgraded the infrastructure from time to time not only to meet the ever increasing requirements of the Institute but the training facilities for the outside user. SN-73 which is upward compatible to PDP-11/34 has been installed and large number of BBC Micro-computers, IBM-PC's, PC-XT's and a PC/AT computer are used continuously by the users. The software support includes FORTRAN-77, BASIC, COBOL, PASCAL, C, LISP and PROLOG. We also have installed a local area network (LAN) using 80386 based file server very recently.

With support from the Dept. of Electronics, Govt. of India a "Resource Centre" for Computer Literacy and Studies in Schools (CLASS) has been established in this Institute in 1984. A series of 3 weeks duration training programme are organised for the school teachers from various schools of the Eastern Region. Under this programme after training the school teachers in the effective use of computers, the respective schools are given two BBC Microcomputers with all the necessary software. The maintenance of these computers and software needs of the schools are met by the BIT resource Centre.

In addition to providing the educational and training facilities the Computer Centre has completed many software projects. It is maintaining the pay-rolls for the Institute and academic transcripts of all the students.

With the support from Department of Electronics, Govt. of India, we are acting as a Resource Centre for MCA Teachers Re-orientation Training Programme from the year 1988. The participants are selected on all India level which will benefit the participating teachers for their re-orientation of MCA courses at Post-graduate level.

LIBRARY

The Library subscribes over 225 Indian and foreign journals annually. During the current year 2000 volumes were added to the existing stock of library. The up-to-date stock of the library comprises of 54,000 books and 14,000 back volumes. Facilities for microfilming and photocopying are also being provided by the library.

MICROPROCESSOR RESEARCH CENTRE

The Microprocessor Research Centre has been expanded to facilitate application programming on fast 32 bit processors namely:

(a) 68020 at 25 MHz, programming and real time trigger trace with performance analysis.

(b) IMST 414 Transputer System for 32 bit multiprocessor environment, emulation using PC-XT, to yield system throughput upto 10 MIPS, using occam language.

both these system design facilities are unique in the eastern sector, and gives BIT the design ability on fast real time processor based system development.

The Hewlett-Packard 9000-350 system has been installed for AI applications with UNIX-OS C, Prolog, and Lisp and assembly language facility. The system is the state of the art machine capable of expansion. Currently the HP 9000 is networked with two HP 64000 development stations to constitute the 'HP-Design Centre'.

The laboratory has completed the following projects:

(a) Camma ray thickness Gauge for Tinplate Company

(b) Non contact automatic length measurement system for Usha Industries.

(c) Control of Ortho cyclic winding machine for Usha Industries.

(d) Eddy current inspection of fast moving tinplates.

Collaborative programmes are initiated with local R & D groups for automatic gauging of rolled steel items by laser techniques combined with Microprocessor instrumentation, in-circuit PC-board checking of industrial PCB's using PC-XT and the development of speicalised programmes for public sector industries.

OUT-TURN OF GRADUATES & POST-GRADUATES

During the year 1992-93, 447 students have qualified for the award of Degrees and Diplomas of the Institute; 286 for Under-graduate Degrees(B.E./B.Pharm.) and 161 for Post-graduate Degrees(M.E., M.Pharm., M.B.A., M.C.A. & D.C.A.) and 1 for Ph.D. Degree; the break-up is as follows:

	No. of students graduated in 1991-92		Total No. of graduates upto 1992-93
I. Under-Graduate Degree			
B.E. (4-Yr.) Degree Course			
Civil Engineering	17		
Computer Science	38		
Electrical & Electronics Engg.	47		
Electronics & Comm. Engg.	62		
Mechanical Engineering	95		
Production Engineering	8	267	8609
B.Pharm. (4-Yr.) Degree Course		19	394
			9003
II. Post-Graduate Degree			
M.E.			
Civil Engineering	1		
Electrical Engineering	9		
Electronics & Comm. Engg.	9		
Mechanical Engineering	6		
Space Engg. & Rocketry	4	29	335
M.Pharm.		12	107
M.B.A.		53	516
M.C.A.		46	191
D.C.A.		21	106
			1255
III. Ph.D.		1	32*

Note :- *The figures indicate the Ph.D. Degrees awarded after the Institute's becoming Deemed University in 1986.

ACADEMIC INNOVATIONS, RESEARCH & DEVELOPMENT

With the support of the Government of India during 1992-93, the Institute has been able to establish and develop infrastructure for interdisciplinary arena of research, and instructions in engineering, pharmaceutical and Applied Sciences. Additional facilities have been created for Post-graduate studies and research in the area of Applied Sciences to meet the needs of specialized research workers and teachers. New programmes for Industry-Institute interaction have also been developed.

During the year under report the following new academic programmes have been introduced:

a) M.Sc. (Bio-Medical Instrumentation) - 2 Yrs. Course

b) M.E. (Automated Manufacturing Systems)- Part-time Course

The Institute finalised details for introducing B.Architecture (5-Yr.) Course from the next academic session (1993-94); the approval of the AICTE and the Council of Architecture for introduction of this programme has been duly received.

Detailed Schemes for introducing the following new courses at the Post-graduate level have also been finalised:

a) M.Sc. (2-Yr.) Information Science

b) M.E. (1½-Yr.) Automated Manufacturing Systems (Full-time Course)

c) Diploma in Hospital Administration (1½-Yr.)

Further the Institute has submitted the proposals for approval of the appropriate professional bodies and the Board of Post-graduate Education, Government of India, for introducing the following new programmes:

a) M.Sc. Electronics

b) M.Sc. Applied Sciences

c) M.Pharm. in Pharmacognosy and Pharmacology

d) B.E. Polymer Engineering

In order to undertake advanced studies in the evaluationary aspects of scientific development, a 'Research Cell' for studies on 'History of Sciences' has already been established at the Institute. This Cell, headed by Dr. R.C. Gupta, the founder faculty member of international repute, is continuously growing with richer collection of books, journals and other materials for initiating investigation for research work. The Centre is duly recognised by the Indian National Academy for supervising and guiding research. The Kunda Kunda Gyanpeetha, Indore, awarded the Arhat Vacana First Prize to Dr. R.C. Gupta for his paper on "The Popularity of the Jaina Value of Pi in China and Japan" for the year 1992. The function was held in June 1993. The paper will also appear in the anthology of the prize-winning essays. Dr. G.G. Joseph's recent book 'The Crest of the Peacock' (Penguin Books, U.K.,1992) incorporates,

according to the author, the research and material which he developed during his visit to B.I.T.,Mesra. Now he is planning to study for another book related to Indian Mathematics during the period 1200-1500 A.D. similarly.Recently the Government of India has approved the research project entitled "Mathematical Approximation in Sanskrit Astronomical Works" proposed to be undertaken by an American scholar in affiliation with B.I.T., Mesra. Prof. Bryan Dorner of the Pacific Lutheran University (U.S.A.) has also desired to record material through interview with Dr. R.C. Gupta for his 'multi-media' text book incorporating historical material. Other achievements of Dr. R.C. Gupta are editing of 'Ganita Bharati' Vol. 15, Nos. 1-2 (Jan-June 1993), collecting details about 70 Indian Doctoral Theses on history of mathematical sciences about to be published in "Historia Mathematica" and an invitation to contribute on Historiography of Mathematics in India in the International Project on the subject.

In pursuance of the new Education Policy of the Government of India, the Institute is keeping pace with the latest technological advances in identified areas of emerging technologies and is creating and establishing necessary infrastructure for Education, Research and Training. The Microprocessor Development Centre has already established a rapport with SAIL, MECON, CMPDI, HEC etc. for design and development of instrumentation and control systems for real time Computer controls. Artificial intelligence and Robot technology are being moved from the research domain to the solution of practical problems.

PLASMA ENGINEERING :

Currently, we are in the process of developing Plasma Engineering Laboratory. Since last few years the Institute has been actively engaged in developing Plasma Technology facilities, basic infrastructure and laboratory for research work and investigations on the propagation of Electromagnetic Waves in Plasma.

SPACE ENGINEERING & ROCKETRY :

It is significant to place on record that the Institute has been the pioneer among the technological institutions to start the programme of Post-graduate studies and research in the area of Space Engg. & Rocketry. It has successfully developed several rocket fuels for solid propellant rockets and has set up a sophisticated research facility in Hybrid and liquid propellant technology. Several projects have been undertaken for the Ministry of Defence, Atomic Energy Commission and I.C.A.R. The work on gelled propellants is noteworthy.

Extensive investigations and research work has been done by the Department in the area of Aerodynamics, Propellant technology, Rocket ·Propulsion and Composite Materials. The Department was engaged in the following research -activities during the year:

AERODYNAMICS :

Supersonic Flow around a Blunt Body using Explicit Finite Difference Method:

The work has been done to determine the structure of the inviscid flow field developed around a blunt body in supersonci flight for spherically blunted forebody with a cylinder as aft body. The flow is described by means of an exact numerical solution of the governing differential equations. The numerical methods used is the well known time dependent explicit scheme proposed by Mac Cormack. The flow field was computed for different free stream Mach Nos and showed irregular flow field without 'Smoothing term'. Hence, an artificial viscosity term was added to the predictor flux for desired flow field accuracy.

Implicit Finite Difference Flow Simulation Past Airfoil using Grid Generation :

The procedure for computing the flow field past a NACA 0012 Air-foil was chosen. The current work aimed

to combine the general transformations grid generations and implicit algorithm in to a viable and versatile flow programme.

Flow Past a Circular Cylinder : An Application of Iterative Scheme and Grid Generation Methods :

The Computational points near a circular cylinder do not form regular grid points. Therefore, grid generation was duly done and flow computations were carried out through successive over Relaxation under FORTRAN 77.

The Trailing Vortices and their Effects on the Follower :

A trailing vortex pair from a 747 Boeing model caused roll in a follower LCA model. Experimental observations and computational results agree.

Some Aerodynamic Studies on Flapped Airfoil :

Experiments on NACA 0012 airfoil showed the effects of flap chord, flap position etc. on net lift and drag charges and changes in the boundary layer and turbylence characteristics.

Effect of Damages on Aerodynamic Parameters of a Finite Wing :

Studies have been carried out on a NACA 0012 to obtain pressure field, lift coefficient of wing loading, down wash, induced angle of attack, turbulence behaviour etc. with and without damages in the wing to assess the effect of the former.

PROPELLANTS AND ROCKET PROPULSION :

A new approach to formulate high energy thixotropic gelled systems based on Monomethyl Hydrazine rocket fuel using synthetic polymeric gellants has been attempted. This Indian Space Research Organisation sponsored programme is being progressed with a view to develop suitable propellant system for the upper stages of ISRO's future launch vehicles.

An analytical study to correlate the effect of aluminization on the performance parameters of gelled UDMH-RFNA bipropellant system with equvalence ratio has been carried out using modified Rosenbrock non-linear optimization technique. This approach is a noval method for detecting phase-transition of combustion products during nozzle expansion.

Efforts have been made to investigate the effect of new burn rate modifiers on combustion of composite solid propellant. A pyridine based transition metal compound, TPCD has been identified as a potential burn rate accelerator.

The research and development work in the areas of fast burning booster stage propellants, rheology of composite solid propellants and pressure dependence of composite propellant burn rate etc. has also been carried out. Different compositions of PVC-AP composite solid propellant have been test fired in a static solid rocket motor and FORTRAN-77 programme has been developed to compute the pressure dependence of burning rate.

The investigations have been made to have a comprehensive understanding of normal and erosive burning mechanism of composite propellants with a view to study the effect of important influencing parameters like gas flow velocity, combustion chamber pressure, mass flow rate and propellant grain size on erosive burning characteristics.

A study on the combustion instability of the solid rocket motor has also been done to understand the effect of binder and oxidizer regression rate, pressure sensitivity coefficient, isobaric composition sensitivity,

quasisteady composition sensitivity and mass ratio of oxidizer to binder on Acoustic Admittence function. A computer programme has been formulated and the Acoustic Admittence function have been computed at varying influencing parameters.

COMPOSITE MATERIALS :

Excellent facilities have been set up to fabricate various types of composite materials by Hand Lay Up technique and vacum Bag technique.

The research work has been carried out to study the effect of thickness and aspect ratio on the buckling strength of composite plates. Two end conditions have been taken for the above buckling studies. Theoretical studies on Fatigue of Carbon Fibre Reinforced composites under adverse environmental conditions have been carried out.

RURAL ENGINEERING :

As initiated during the preceeding years, fibre reinforced cement sheets, design and implementation of low cost housing and improvement in rice husk cement are now on nearly completion stage. The new low cost house designs and models for effective dissementation of knowledge regarding earthquake safety and flood mitigation along with a model of rural water supply scheme to be applied to the water starved districts of the State have been exhibiting encouraging results.

Ground water plays an important role in the development and management of water resources. The ever increasing demand due to explosive population growth, coupled with industrial and agricultural requirements has put an enormous strain on this valuable resource. The research work concerns developing a generalised model for pumping activities of aquifers. The practical sustained yield without damaging aquifer characteristics in relation to rechange and withdrawals for steady and unsteady flow conditions are being investigated.

Experimental investigations on the flow characteristics of an oblique weir has been initiated in the laboratory. The variation of discharge coefficient with respect to height and thickness of weir for various oblique angles are being investigated. Modular and nonmodular conditions of weir is extensively studied.

HYDROLOGY :

A comparative study of various methods like SMEMAX (small-median-maximum) transformation SP-PDF (sine power probability density function). Gumbel and Log Pearsan method are adopted for a short and long term datas. The realiability of these data under above methods are being investigated.

MECHANICAL ENGINEERING :

A Hi-tech Wind Energy Convertor of German design has been acquired and installed at Puri(Orissa) for experiment. A solar heat convertor based on an Australian design has been developed which is leading the way for designing an experimental 100 Kw steam generating station. Significant research work has been carried out in the area of bi-fueling of I.C. Engines. Emphasis has been laid on investigation into the suitability of various types of alternate fuels for reciprocating combustion engines. Bio-gas energy and geo-thermal energy research works have also been initiated.

The proposals of this Institute in this regard are under consideration of the Government of India.

Research programmes in collaboration with SAIL(R&D) and MECON for development of new materials for hostile environment and CAD analysis of shape control in cold Rolling research is now in progress. Collaborative programmes with H.E.C. in the areas of Solar Energy and Waste heat recovery are also under progress.

An attempt had been made to run conventional I.C. Engine on Hydrogen in the Department of Mechanical Engg. with minor modification in the Induction System of I.C. Engine. The conventional engine was successfully operated on Hydrozen. However, the engine could produce only half the rated power because of repeated back-firing. The work to avoid back-firing is being carried out in the Department.

Regarding production of Hydrogen, experiments have been conducted to use Solar Energy for the generation of Hydrogen through electrolysis of water in the Department. Successfully 52 litres of Hydrogen was generated using Solar Energy through electrolysis of water. Work in this field is still being carried out for the optimum generation of Hydrogen. Regarding storage, Hydrogen can be stored in the form of gas in the pressurised tank, and as a Cryogenic liquid. But the best form of storage is in the form of Metal Hydrides. As Hydrides offers highest storage per unit volume. In this Department Magnesium metal has been used for the storage of Hydrogen. Experiments are being carried out in the search of different Hydrogen storage media. This method of storage is the safest method and possess highest volumetric density. In the experiments conducted so far regarding hydride storage of Hydrogen, 0.04 gm of Hydrogen was successfully stored in 1 cm^3 (2 gm) of Magnesium. Efforts are being made to maximise the storage in the Magnesium metal.

PRODUCTION ENGINEERING :

The Department of Production Engineering has introduced a new Post-graduate programme leading to the M.E. Degree in Automated Manufacturing Systems. Manufacturing Systems Engineering is necessary for continued technological and economic growth. The Post-graduate course in Automated Manufacturing Systems aims at giving the students an indepth understanding of the analytical and computer models for the design of manufacturing systems, as well as the technologies and methodologies that support integrated systems. Teaching and research activities will cover the different aspects of actual manufacturing, including CAD/CAM, Robotics, Manufacturing Automation, Flexibly Integrated Manufacturing Systems, Artificial Intelligence and Expert Systems.

The Department of Production Engineering has conducted the Entrepreneurship Development Programme for the teachers of the Polytechnics of Bihar sponsored by Government of Bihar. The programme was conducted from 27.3.93 to 10.4.93.

The Department has completed design of Exhaust Mechanism for the pollutents of the pollution control equipment undertaken by the Institite for Heavy Engineering Corporation and it has been successfully accomplished.

COMPUTER ENGINEERING :

The Department of Computer Engineering has organised several short-term courses on 'Computer Applications' during the year under report. The Department has conducted a short course on Computer Applications for United Commercial Bank Employees at Ranchi for two and half months duration in batches at our Extension Centre, Lalpur, Ranchi. It has also conducted two weeks Computer courses for Polytechnic teachers, Government of Bihar in Feb.1993.

Some of the Equipment added in the laboratories of the Department include :

Personal Computers, Mini Computer Magnum IV with 40 terminals, Mini CP 486 RISC based Modi Olivetti System, Personal Computers PC, PCST's, Personal Computers PC/AT's and Digital VAX-5100 RISC based.

In addition, the Department has extended the Laboratory facilities to more users by adding two more user's terminal rooms for SN-73 system, other for Magnum-IV system, Microvax-II with 8-terminals for users, CP 486 System with 16 terminals, 20 nos. of PC,PC/XT and PC/AT's for students' use, 40 terminals to magnum system, 32 terminals to VAX 5100 system and one more Computer Lab. (user room) in the first floor of the Department which can accommodate 40 students.

The Department invited Dr. M. Damodaran, Department of Computer Sc. & Engg., University of Honston, Honston, U.S.A. under Indo-US Full Bright Scheme from May 13 to Sept. 13, 1992; and also received a research grant this year from Council of Scientific & Industrial Research, Government of India for a period of 3 years.

PHARMACEUTICAL SCIENCES :

During the year under report, all the disciplines of Pharmaceutical Sciences have shown significant progress and research were carried out in all the major disciplines.

In the field of Pharmaceutics stability studies, of different dosage forms, release rate of medicament through the ointment bases, comparative evaluation of marketed products were some of the important topic of research carried out in the Department.

In the field of Medicinal & Synthetic Chemistry the Department has made significant progress and some of the major projects were undertaken as the U.G.C. sponsored

projects. A number of compounds were synthesized and characterized. These compounds are being further evaluated for useful pharmacological and clinical properties. 'Work is in progress on these synthetic Tropane analogues and others.

In the field of Pharmacognosy & Phytochemistry a number of Medicinal plants of the area were investigated. through biological screening method efficacy of some of the antiinflammatory, antidiabetic and cholestrol lowering properties were established in these plants. A number of compounds were isolated and characterized. The other important aspect was to undertake standardisation of Herbal formulations. Such methods for an immunomodulatory poly herbal preparation were developed and further work is in progress. The aim is to identify suitable immunomodulatory herb to be effective in protozoal disease.

Yield performance studies and effect of fertilizers, auxins etc. on medicinal plants and their constituents were other area of research.

In the field of Pharmacology significant contributions were made by way of research on synthetic analogues or compounds isolated from natural sources. Attempts have been made to develop suitable biological screening methods for immunomodulatory agents.

In the discipline of Biotechnology, an emmerging area of research, major project has been sanctioned by Ministry of H.R.D. and work on Spirulinea cultivation on sewage effluents and thus water purification and recycling has been thus initiated.

R & D Scientist from Mahrishi Ayurveda visited the Department on two different occasion and interacted with the student and faculty. The main topic was standardisa-

tion of Herbal formulation and impact of modern technique on Ayurvedic preparations. A fruitful discussion was held.

The Department has equipped itself with better and modern and modern facilities by making suitable addition in most of its laboratories. Some of the costly and sophisticated instruments like CHN analyser purchased during previous years was commissioned during this year. Other sophisticated instruments added and commissioned are:

Conductivity meter (Digital)
Dissolution dialysis apparatus (Digital)
Rotary film evaporator
Differential Scanning Calorimeter (Microprocessor based)

Any collaborative programme or consultancy work undertaken by the Department; collaboration with B.I.S.R. and S.I.R.D.O. the sister organisations of the Institute was maintained, with an aim to encourage and help enterpreneur to set up small scale units in the field of Pharmaceuticals. Agrotechnology for number of medicinal plants were also developed. Department has helped in the analysis of different types of products to the students of other departmen of the Institute whenever asked for. Through STANCERT department is providing testing facilities to the pharmaceutical units of the state and other adjoining states. Department is collaborating with C.D.R.I. Lucknow, Mahrishi Ayurveda and other organisation on number of research projects.

MANAGEMENT

The Department of Management offers consultancy services and special training programmes. A Correspondence Course of six months for employees of MECON, Ranchi was also conducted. Eminent scholars and industrialists are invited as guest speakers/visiting faculty to keep students in touch with the latest developments; further training on Computer has been made compulsory.

ELECTRONICS & COMMUNICATION ENGINEERING :

Theoritical Modelling and simulation of solid-state devices for high speed and optoelectronic application have been an active arena of research in the Department. The work on the project - "Computer Simulation of Heterojunction solid-state Photodilectors for Fibreoptics Communication Systems", sponsored by the Department of Science & Technology, Government of INdia is in progress. During the year under report, a number of novel solid-state source delectors structures for integrated optoelectronics applications have been introduced. These include Double-Heterostructure InAs/InAs Sb Light - emitting - Diode for application in 2m to 6m wavelength region, High Electron - Mobility - Phototransistor and Photo-MISFIT. Further,a number of compact Computer programmes using Fortran-77 and Turbo-Pascal for simulating the devices on IBM PC (Ax/xT) have also been developed. These programmes provide global characteristics of the devices as well as useful design data. Work on the Research Project entitled "Development of Optical Fibre Communication System for Underground Mines" is in progress. Moreover, research programmes in collaboration with SAIL(R&D) and CMPDI on the development of Fibre based systems and on Linw Communication system for underground and open cast mines are also in progress. Research work in the area of Fibre Sensors, FOLANS, High Frequency Optical Devices and Development of CO_2, NO_2 and CH_4 Gas monitoring system for environmental pollution has been undertaken in the Department. Work is in progress. The Department also plans to develop security system using Optical Fibre Sensors.

In addition to the research and development works, new courses and projects have been introduced in optical-communications and integrated optics, picturephone, fibre optic sensors, remote optic sensing, fibre and videobased digital holography, Digital Image Processing and Data Communications.

A PC 486 based Landmark Computer with 4 terminal has been installed in the Department for doing Under-graduate and Post-graduate project. An advanced Digital Communication Laboratory and advanced Microwave Communication Laboratory have been started in the Department. In the near future a Digital Image Processing Laboratory and VLSI Design Laboratory is likely to be set up in the Department. The equipment has been ordered for these Laboratories. The Department organised a 2-weeks Summer School Programme on **Recent Trends in Optoelectronic Devices & Systems** on June 7-18,1993.

Dr. P. Chakraborti, Associate Professor of the Department has been awarded Indian National Science Academy Visiting Fellowship 1993-94 to do collaborative research with the Microelectronics Centre, I.I.T., Kharagpur.

ELECTRICAL & ELECTRONICS ENGINEERING :

During the year under review the Department has organised an international seminar under the auspices of the IEEE, and is well represented by a number of Institutions from the country and abroad. More that 50 papers were presented and the best student papers were awarded merit certificates and token cash honorarium.

To meet the growing need for real time processor control, a specially designed short course was organised for working engineers from SAIL. The programme is of one week duration, involving practical and theoretical exposure to real time control of processes and systems using the latest processors. The course has brought forth a course book detailing the lectures and programmes.

The Department has successfully completed a number of prestigious development projects for industry. On the basis of our earlier work to the Tinplate company we have taken up yet another Gamma Ray development project for on line inspection of tin sheets on the shop floor. Based

on the earlier work the Department has perfected and designed a much better system to meet international standards. This new second unit will be installed shortly. Based on the two projects, the Tinplate Company has offered two more projects entitled:

(a) Import substitution of a balancing teaser transformer for their 6-phase thyrister units.

(b) On the basis of the prototype studies conducted by the students last year, a bowness control project to automatically control the flatness of tin sheet, using a personal computer as a control unit. This will be a unique control scheme to be used on the shop floor.

The Department has completed a fast and accurate Computer measurement system to estimate the percentage iron content of ferric oxide and sponge iron. The system designed is far better than any equivalent imported system in both speed and accuracy. On the basis of this development, an on-line and off-line control project is under review with the SAIL (R&D).

A flux gate magnetometer unit was designed and implemented for weak magnetic field studies. The unit can sense fields as weak as 10 exp -5 gauss. A preliminary prototype is working well and sensitivity improvement are being made.

Switched capacitor systems were built as part of digital signal processing laboratory. Developments in the area on fast AD conversion using switched capacitor state of the art technology were understood and the ideas were implemented and tested on hardware.

Inroads were made by software studies, in the operation of artificial neural networks. Considerable

theoretical investigations are published, but very few institutions work on the corresponding implementation on hardware. To encourage this new area the Department is offering courses in this emerging area. This subject addresses problems that are intractable, or cumbersome with traditional methods. These new computing architectures are inspired by the structure of the brain. These are radically different from the computers that are used widely today. Neural networks are massively parallel networks, using interconnections with surprisingly simpler processors.

Video degitising hardware is being built for industrial pattern recognition and control applications. Currently most of the frame grabbing and signal degitisation systems are imported. With the new systems that are being developed will make video inspection and control schemes feasible for Indian industry, and will be cost effective. A fast AD Convertor was implemented with a convertion speed of 50 million samples per second for degitisation.

The Department is proud to keep on record, that one of our students, Shri Nayar has been awarded a prestigius development grant of $500,000 for the development of special purpose sensors for Robot. Shri Nayar has built a Robot at B.I.T.

CIVIL ENGINEERING :

The Department of Civil Engineering has conducted the following short-term courses during the year under report:

1) Design Methodology and Quality Awareness : A course for the Executives of Central Coalfields (Feb. 1993).

2) Water Quality Surveillance : A course for UNICEF and Public Health Department Executives (May 18-19, 1993).

3) CAD-CAM Programme : A course for Polytechnic Teachers (March 16 - 31, 1993).

During this year the Department has set-up a Computer Laboratory with a 486 Sx machine, printer and plotter. The Department has also commissioned an Apparatus, SCALAR ANALYSER for analysis of liquid pollutants in the Environmental Engineering Laboratory.

APPLIED MATHEMATICS :

During the year under report a number of research papers and articles have been published by some faculty members and research scholars. A research scholar recently visited U.S.A. and Canada to discuss the Research programme with various Faculty members of the following Universities:

(a) System Research Centre, University of Maryland and Harvard University.

(b) University of Toronto, Canada.

Finally Dr. Chelliah Sriskandarajah, Department of Industrial Engineering, University of Toronto, Canada, who is dealing particularly with Research programme in 'Petrinet Modelling and performance evaluation of Industrial Problem' suggested some modifications and a Project 'A study of the use of Petrinet' for performance evaluation of Asynchronous concurrent system in 'Rapid prototyping' has been completed.

INSTITUTE-INDUSTRY INTERACTION

The Institute is one of first technical institutions in the country to have meaningful interaction with industry almost from its inception. A large number of projects have been undertaken in collaboration with both private and public sectors and several import substitutes have been

developed and designed which have been passed on for commercial production to industrial units. With the encouraging response from the Government of India under the Scheme "Institute-Industry Interaction", the Institute has established interaction with two leading organisations namely, Heavy Engineering Corporation (H.E.C.), Ranchi and Central Coalfields Ltd. (C.C.L.),, Ranchi.

GOVERNMENT OF INDIA SUPPORT UNDER NEW PLAN SCHEMES :

During the year 1992-93, the Government of India, Ministry of Human Resource Development has provided financial support for the Development of the following Laboratories/ Programmes :

1) An integrated approach towards Pollution Control and Energy Conservation
2) Computer Science
3) Micro-Engineering
4) Metallurgy
5) Precision Manufacturing Laboratory
6) Computer Vision Laboratory
7) Development of Environmental Monitoring System for NO & CH Gases
8) Material Science

PARTICIPATION OF FACULTY IN NATIONAL AND INTERNATIONAL CONFERENCES/SEMINARS

1992-93

1. P.K. Mahanti, Professor, Deptt. of Computer Sciences, participated in 'International Conference on Moving Boundaries 93' at Milano, Italy from June 23-26, 1993.

2. P.K. Mahanti, Professor, Deptt. of Computer Sciences, participated in 'International Conference on Modelling & Simulation' held at IIT, Delhi from Dec. 9-11, 1992.

3. R.D. Bajpai, Associate Lecturer, Deptt. of Computer Sciences, participated in 'International Conference on Modelling & Simulation' held at IIT, Delhi from Dec. 9-11, 1992.

4. P. Chakrabarti, Associate Professor, Deptt. of Electronics & Communication Engg., participated in the following International Conferences held at Adelaide, Australia from Aug. 11-13, 1992:

   (i) Fourth 'Asia-Pacific Microwave Conference'

   (ii) Fifth 'Australian Symposium on Millimetre and sub-millimetre Waves' in conjunction with APMC'92.

5. S. Jha, Assistant Professor, Deptt. of Pharmaceutical Sciences, participated in 'National Seminar on Herbal Formulation, Standardisation and Quality Control' held at M.S. University, Baroda in Sept. 1992.

6. S. Jha, Assistant Professor, Deptt. of Pharmaceutical Sciences, participated in 'National Conference on Herbal Formulation - Yesterday-Today-Tomorrow', at Faculty of Pharmacy, Andhra Univ., Visakhapatanam in Jan.'93.

7. S. Jha, Assistant Professor, Deptt. of Pharmaceutical Sciences, participated in 'National Conference & Workshop on Ethanopharmacology' held at Trivandrum in May, 1993.

8. B.N. Sinha, Assistant Professor, Deptt. of Pharmaceutical Sciences, participated in 'National Conference on Herbal Formulation - Yesterday-Today-Tomorrow', at Faculty of Pharmacy, Andhra University, Visakhapatanam in Jan.1993.

9. P.R.P. Verma, Assistant Professor, Dept. of Pharmaceutical Sciences, participated in 'Workshop for Post-graduate Teachers and Research Guides in Pharmaceutics' held at Bombay in October 1992, conducted by SCI-TECH Bombay and BVP-PERD Centre, Ahmedabad.

10. D. Sasmal, Associate Professor, Deptt. of Pharmaceutical Sciences, attended the 'Seminar on Improvement of Productivity in the changing Scenario/Globalisation' held at Ranchi in November 1992, organised by Institute of Engineers (India).

RESEARCH PAPERS & BOOKS PUBLISHED

A list of Research Papers and Books published by the Faculty of the Institute during the year 1992-93 is given below:

Civil Engineering

(1) B.S. Rajeevalochanam, 'An innovative Water Resources Management for the hilly tracts of Chottanagpur area of Bihar' - National Seminar on Water Harvesting at R.E.C., Tiruchirapalli, June 25-26, 1993.

(2) B.S. Rajeevalochanam, 'Rural Small Scale Hydropower Projects - an imperative alternative to chronic power starved Bihar Plateau' - National Seminar on small hydropower projects 3 and 4 Cec. 1993 C.I.T., Coimbatore (Communicated).

(3) B.S. Rajeevalochanam, 'An investigation into potential yield and ground water pumpage of well aquifer system'- Paper presented at a Symposium on Ground Water depletion in Bihar Plateau - Reasons and Remidies, organised by BESA.

(4) B.S. Rajeevalochanam and J.S. Ruhela, 'An appropriate water resources management techniques in plateau regions to achieve additional crop yield' - 17th European Regional Conference of ICID Varna Bulgaria, March 22,1993 (Communicated).

(5) Gopal Pathak, the following three papers were accepted for the 2nd International Conferences on Safe Communities held at University of Glasgow, U.K. during Sept.7-9,1992:

i) Greenhouse Effect : Environmental Assessment and Control.

ii) Ozone Friendly Refrigeration Alternatives.

iii) Environmental and Health Impacts on Coal-Mining Communities with special reference to Indian conditions.

(6) Gopal Pathak, 'An approach to Educating Engineers in occupational injury, safety and health with special reference to Developing Countries' - 2nd World Conference on Injury Control held at Atlanta, Georgia, USA during May 20-23, 1993.

Computer Engineering

(1) P.K. Mahanti, 'Computer Analysis of the behaviour of a Predator - Pray model in the presence of environmental noise - 1' - Presented at the Moving Boundaries-93 Conference held at Milano, Italy, June 23-26, 1993.

(2) P.K. Mahanti, 'Application of Computer in Small Scale Industries' - Presented at Industry Academic Interaction Conference held at M.M.M. Engg. College, Gorakhpur, Aug. 12 - 13, 1993.

(3) P.K. Mahanti and R.D. Bajpai, 'Database retrieval Algebra for feature terms extensions to datalog - Published in Proc. Int. Conf. on modelling and simulation AMSE Press, Vol. 1 pp. 175-187, 1992.

Electronics & Communication Engineering

(1) P. Chakrabarti et al, 'Effect of Illumination on the Capacitance of a proposed hetero-MIS diode' - IEEE Trans. on Electron Devices Vol. ED-39, pp. 507-541, 1992.

(2) P. Chakrabarti et al, 'Numerical Simulation for estimating C/V characteristics of MODFET under illumination' - Solid-State Electronics Vol. 35, pp. 225-227, 1992.

(3) P. Chakrabarti, R, Anand and V. Sribivas Rao, 'I-V Characteristics of an Optically controlled Si-MESFET', Solid-State Electronics, Vol. 35, pp. 587-592, 1992.

(4) M.K. Kowar, D.K. Pal and A.N. Daw, 'Improved model of silicon epitaxial growth by VPE' - International Journal of Electronics (U.K.), Vol. 72, pp. 103, 1992.

(5) P. Chakrabarti, N.L. Shrestha, S. Srivastava & V. Khemka, 'An Improved model of an Ion-Implanted GaAs OPFET', IEE Trans on Electron Devices, Vol.ED-39, pp.2050-59,1992.

(6) P. Chakraborti, S.K. Shrestha, A. Srivastava & D. Saxena, 'Switching characteristics of an optically controlled GaAs - MESFET', IEEE Trans. on Microwae Theory and Tech. (accepted for publication).

(7) P. Chakrabarti and J. Pal, 'Optically controlled characteristics of a new hetrojunction Field Effect Transitor', Applied Physics A, Vol. 54, pp. 186-190, 1992.

(8) P. Chakrabarti, A. Chandra, V. Gupta, H. Shah and Y. Ravi Kumar, 'Optically controlled characteristics of an Ion - implanted hetro - MIS capacitor', IEE Proc., Part - J (accepted for publication).

(9) B.K. Mishra, V. Pradeep and P. Chakrabarti, 'Microwave characterisation of an optically controlled high electron mobility transistor', J. IETE Spl. Issue on Microwave and M M Wave sources and applications (accepted for publication).

(10) P. Chakrabarti and B. Umapali, 'An optically controlled Double - Velocity - Avalanche - Transit - Time (DOVATT) diode', Proc. Fifth Australian Symposium on millimetre and submillimetre waves, pp. 92, Adelaide, Australia, 1992.

(11) P. Chakrabarti and B.K. Mishra, 'Effect of illumination on C-V Characterisation of a new hetro - MIS Capacitor', 1992 Asia - Pasific Microwave Conference, Proc., Vol.1, pp. 383-386, Adelaide, Australia, 1992.

(12) P. Chakrabarti, S.K. Shrestha and K. Satish Kumar, 'Effect of illumination on Y - Parameters of GaAs MESFET', Proc. of the Fourth International Symposium on Recent Advances in Microwave Technology to held in New Delhi-Agra, Dec. 15-18, 1993 (Accepted for publication).

(13) S. Varma, 'Development of Network Interface Unit (NIU) for IAN Protecals' - presented under CSIR Scheme in collaboration with INSA in June 1992 at Geneva.

(14) S. Varma, 'Network Interface Unit Protocols for Communication Network' - IEEE Students branch, Calcutta Divn. pp. 21-23, Nov. 1992.

(15) Ms. K. Madhavi and K.K. Masand, 'Corrections to Permeability and Propagation Constant Curves in Ferrites' - Institution of Engineers (India), ET. Vol.73, pp. 137-141, Nov. 1992.

Management

(1) A. N. Jha and Ms. Manju Bhagat, 'Co-operative Movement in India with special reference to credit and Banking Societies in North Eastern Railways' - presented at XLVI All India Commerce Conference, Rohtak and published in Indian Journal of Commerce, March 1993.

(2) Ms. Manju Bhagat, 'New Work Culture & Productivity'- published and presented in 8th All India Management Congress, New Delhi, Oct. 18-19, 1992, organised by Indian Institute of Business Management, Patna.

(3) Ms. Manju Bhagat, 'Strikes & Lock Outs' - presented and published in the Indian Journal of Labour Economics at the Conference held in Jawahar Lal Nehru University, Jan. 2-4, 1993.

(4) Ms. Manju Bhagat, 'HRD and Industrial Relations with special reference to Bokaro Steel Plant' - published in the Conference organised by Steel Authority of India Ltd., Bhilai Steel Plant, Bhilai, April 5-6, 1993.

Mathematics

(1) R.C. Gupta, 'The First Unenumerable Number in Jaina Mathematics', published in Ganita Bharati, Vol. 14, pp. 11-24, 1992.

(2) R.C. Gupta, 'Sundararaja's improvements of Vedic Circle-Square Conversions', published in Indian Journal of History of Science, INSA, New Delhi, Vol. 28, No. 2, pp. 81-101, April-June, 1993.

(3) R.C. Gupta, 'Jaina Cosmography and Perfect Numbers', published in Arhat Vacana, Vol 4, Nos. 2-3, pp.89-94 April-July, 1992.

(4) R.C. Gupta, published the following Articles in Ganita Bharati, Vol. 14, 1992:

(a) 'Varahamihira's Calculation of C (n,r) and the Discovery of Pascal's Triangle', pp. 45-49.

(b) 'Abu'l Wafa and His Indian Rule about Regular Polygons' pp. 57-61.

(c) 'On the Remainder Term in the Madhava-Leibniz's series' pp. 68-71.

(5) R.C. Gupta, 'New Researches in Jaina Mathematics and etc.', published in Nanasayara (Ocean of Knowledge), Delhi, No. 9, pp. 22-27 and 96, 1993.

Pharmaceutical Sciences

The following Papers were presented/published in the 44th Indian Pharmaceutical Congress Association, Bangalore held in January 1993:

(1) G.M. Panpalia and Ms. Sushmita Guha, 'Influence of Crystal habit on physical stability of Metronidazole Benzoate deflocculated suspensions'.

(2) G.M. Panpalia and A.K. Tiwari, 'Influence of Crystal habit on dissolution profile of Sulphamethoxazole'.

(3) G.M. Panpalia, Ms. Urmi Chourasia & A.K. Handa, 'Influence of in-situ emulsification on the stability of lotions through zeta potential'.

(4) G.M. Panpalia and A.K. Tiwary, 'Influence of Crystal habit on stability of trimethoprim flocculated suspensions'.

(5) S. Jha, 'Determination of Hecogenin and Neotigogenin from the Roots of Tribulus terrestris L. at different stages of root development', presented at the National Seminar on Herbal Formulation/Standardization and Quality Control held at Baroda in 1992.

(6) S. Jha, 'Ethno-botanical and phytopharmacological study of Nyctanthes arbortristis', presented at the National Seminar and Workshop on Ethno-pharmacology, Trivandrum held in 1992.

(7) S. Jha, 'Determination of Hecogenin/Neotigogenin from the roots of Tribulus terrestris at different stages of root development', published in Indian Journal of Natural Products, Vol. II, pp. 12-14, 1992.

(8) S.P. Basu, D. Sasmal, N.G. Kakde and J.K. Mondal, 'Total Synthesis of Pongamol' - paper presented in the 44th I.P.C.A., Bangalore held on January 11-13, 1993.

(9) D. Sasmal, J.K. Mondal and S.P. Basu, 'Prolongation of Sleeping Time in Rat by Pongamol' - paper presented in Med. Sci. Res. 20, 787 (1992).

(10) D. Sasmal, J.K. Mondal, S.S. Mahli and S.P. Basu, 'Anticonvulsant Effect of Pongamol' - Communicated (1993).

(11) D. Sasmal, S.K. Ghosh, K. Satyanarayana and S.P. Basu, 'Haematological Evaluation of Cyanolipid and Triglyceride fraction of Sapindus Mukorossi Gaertn Seed Oil in Mice' - Communicated (1993).

(12) B.N. Sinha and S.P. Bhatnagar, 'Phytochemical Survey of Chhotanagpur' - presented at the National Conference on Herbal formulations (Yesterday-today-tomorrow), Visakhapatanam, January 28-29, 1993.

(13) B.N. Sinha, S. Jha, N.K. Singh, 'An Ethnobotanical & Phytopharmacological Study of Nyctanthes arbortristis Linn' - paper presented at the First National Conference & Workshop on Ethnopharmacology,Trivandrum, May 24-26,1993.

(14) B.N. Sinha and J. Thanigavelan, 'Phytopharmacological Studies on Melothria madraspatana', presented at FIP Congress of Pharm. Sciences, Lyon (FRANCE), Sept. 13-19, 1992.

(15) B.N. Sinha, Jyoti Sinha & N.K. Singh, 'Ethnomedicinal & Phytopharmacological Studies on Eugenia jambolana', World Congress of Pharmacy & Pharm. Sciences 1993, Tokyo, Japan. (Accepted for presentation.)

(16) Ch. Subramanyam and A.K. Sharma, 'Studies on azabicyclo system : Synthesis of 6-phenyl-10-methyl-3,10-diazabicyclo 4.3.1 decane'. (Communicated)

(17) M. Adiraj, Ch. Subramanyam and A.K. Sharma, 'Synthesis and study of new 10-methyl-3,10-diazabicyclo 4.3.1 decane analogs', presented at 44th Indian Pharmaceutical Congress, Bangalore, 1992.

(18) P.R.P. Verma and C.M. Prasad, 'Standardization and Bioavailability of Lauha Bhasma (Ayurvedic) Physical and Chemical Evaluation of Lauha Bhasma' - Part I & II. (Communicated).

(19) V. Rajni and P.R.P. Verma, 'Diffusion studies of Ibuprofen from Ointment Bases'. (Communicated).

(20) K.V. Rangaiah, S. Madhusudhan and P.R.P. Verma, 'Sustained release of Theophylline from HPMC and Eudragit Tablet'. (Communicated).

(21) Ajay Dubey and S.P. Bhatnagar, 'Isolation, Purification, Characterisation and Pharmacological Study of Lectins present in Vigna radiata (green gram) variety PDM', presented at 44th Indian Pharmacy Congress held at Bangalore, January 1993.

(22) S.P. Bhatnagar and S.K. Agarwalla, 'Standardization of a Herbo-Mineral immunomodulatory Formulation'- Report presented at the National Seminar on Trends in Formulation, Standardisation and Commerce of Herbal products at M.S. University, Badoda.

Production Engineering

(1) Alok Varma and S. Kumar, 'Product design for competitive -ness : Improving productivity in the changing scenario'- Proceeding Seminar on 'Improvement of Productivity in the changing scenario', IE(I), Nov. 1992.

(2) S. Kumar, 'Concurrent Engineering Environment - the next source of competitive advantage', Proc. Quality & Maintenance Mgt. in CEE, IIPE, Feb. 1993.

(3) B.K. Singh, D. Sasmal and K.P. Sinha, 'Ergonomics - A necessary tool for Industrial work design' - Proceedings Seminar on 'Improvement of Productivity in the changing scenaria', IE(I), Nov. 1992.

(4) S. Kumar, 'Integrated Technology - Blood stream for improving productivity of a futuristic factory in a changing scenario' - Proceedings Seminar on 'Improvement of Productivity in the changing scenario', IE(I), Nov.1992.

Books

S. Kumar, "Industrial Robots and Computer Integrated Manufacturing", Oxford & IBH Publishing Co.,New Delhi,1992.

Applied Physics

(1) P.K. Barhai and M.K. Nanda, 'Anodic Vacuum Arc as a New Coating Device' - presented at the 7th National Symposium on Science & Technology of Plasma (Plasma Science Society of India), Bombay University, Bombay, Nov. 3-7, 1992.

RESEARCH PROJECTS

Work on the following Research Projects have been undertaken in the Institute during 1992-93:

Civil Engineering

1. Flood Protection Measures for Mines situated in the potential flood prone area of river Damodar at Gobindpur, Purnadih and Rohini (A Project for CCL).
2. Geotechnical guidance to the following organizations in and around Ranchi:
   - (i) C.P.W.D.
   - (ii) C.C.L.
   - (iii) Bihar State Bridge Corporation
   - (iv) Defence Establishment.
3. Characteristics of flow over oblique weirs of finite crest width.
4. A study on Siphon cross jet energy dissipator system.
5. Need of basic health education amongst coalmine workers with special reference to Indian Coalmines.
6. Microhydel power generation - an alternate study.
7. Soil Stabilization.

Space Engineering & Rocketry

1. 'Experimental Studies on Elastic Buckling of Composite Plates' - Project sponsored by Defence AR & DB.
2. 'Development Studies on Gelled Monomethyl Hydrazine (MMH) Propellant' - Project sponsored by ISRO.
3. 'Experimental Studies on Fatigue of Carbon Fiber Reinforced Composite under Adverse Enironmental Conditions - Project sponsored by Defence AR & DB.

4. 'Experimental Studies on Elastic Buckling of Glass/ Epoxy Composite Plates under Thermal Loading' - Project sponsored by H.R.D.

Applied Chemistry

1. The following two projects under the Direct Central Assistance are sponsored by the Ministry of H.R.D., Government of India :

   (a) 'Re-refining and recycling of Lube Oil'

   (b) 'Characterisation of Crude Oil and their Distillates by differential scanning Calorimetry and FT-IR System'.

2. 'Structural and Compositional Studies of Asphaltenes & Resins from Indian Crude by Spectroscopic Techniques' - Project submitted through the Indian Institute of Petroleum, Dehradun to the Council of Scientific and Industrial Research Human Resource Development Group. The Project is under process by the Evaluation Committee and the results are soon expected.

Applied Physics

1. 'Studies of Arc Plasma Characteristics of a Cascaded Arc Plasma Generator' - Project approved for funding by the DST, New Delhi under 'Satellite Research Programme in Plasma Physics'.

2. 'Testing of Ablative Materials for Aero-Space Applications Utilizing Plasma Jet' - Project submitted to Indian Space Research Organisation (ISRO).

3. 'Metallic Multilayer Coating with Anodic Vacuum Arc'- Project submitted to DST under 'Satellite Research Programme in Plasma Physics'.

SCHOLARS REGISTERED FOR Ph.D.

During the year 1992-93, three scholars have completed their research qualifying for the award of Ph.D. Eleven new scholars have registered for Ph.D. Programme in the subjects/areas of their study as stated below :-

Name of Scholars	Subject of study
1. Sri Taposh Kumar Roy	Problems and Prospects of Marketing of Drug Manufactured by Small Scale Industries.
2. Sri Goutam Sutradhar	Development of Forged Components using Sintered Preforms.
3. Sri M. Adiraj	Synthesis and use of Methyl Phosphonate containing Oligonucleotides for the study of B - Z DNA Transition.
4. Sri Sudhir Sharan	Computer based Analysis & Modelling for Integrated Working Capital Management.
5. Sri R. S. Yadav	Impact of Physical Training on Managerial Effectiveness - a case study of some Institutions and Organisations.
6. Sri Pawan Kumar Rai	Solid Waste Management in Steel Plants for improved Environment.
7. Mrs. Runa Chakraborty	Fracto-Emission from Polymers and Polymer Composites.
8. Sri Amit Jana	Theoretical Modelling of Hetero-Junction field Effect Transistor for high speed and Opto-Electronics Applications.

9. Sri S. K. Datta	Some Theoretical studies on Optically controlled Micro-wave Semi-conductor Devices.
10. Sri A. K. Mishra	Some Experimental studies on Environmental Pollution due to Diesel Engine Exhaust.
11. Sri S. N. Thakur	Castability, Forge-ability, Mechinability and Fracture behaviour of Alluminium Silicon Alloys.

Besides the above, the following 28 scholars were registered for their Ph.D. in the previous year(s); they are continuing the work under the guidance of the respective Doctoral Committees :-

1. Sri B. K. Mishra	Computer Aided Modelling of Solid-State Photodetector.
2. Sri Durgesh Pant	A complete study of Reconfi-gurable Computer Systems.
3. Sri Prasant Kumar Mukherjee	Quadratic Studs and Methods of Approximating them in Ancient and Mediaeval Mathematics.
4. Ms. Sandhya Rani	Study of some Chemical aspects of stress induced Magnetic & Electromagnetic Effects in Transition Metals and Intermetallic Compounds.
5. Sri Arun Kumar	Synthesis and Pharmacological studies of Indan Analogs.
6. Sri Ch. Subramanyam	Synthesis and study of Analogs of 6-Phenylpreudopelletierine.

7. Sri Rabindra Pd. Sharma	Modelling of the Combustion Process for a fuel Efficient four Stroke spark Ignition Engine.
8. Sri Arbind Kumar	Investigation on Metal Hydrides as carried to run the future vehicle engine on Hydrogen.
9. Sri T. R. Ranganath	Studies on Honey Cone Stabilised Saltless Solar Pond.
10. Sri Mihir Kumar Nanda	Ultra short Laser pulses and related Plasma Phenomena.
11. Sri Amal Kishore Prasad	Dispersion Modelling of Particular and Toxic Metallic Emissions.
12. Ms. Urmi Chaurasia	Influence of the Nature of internal phase on the stability of o/w Emulsions through Zeta Potential.
13. Sri U. S. Prasad	Stress induced Magnetic and E.M. effects in Metals.
14. Sri Subhendu De	Mathematical Model of Air Pollution problems due to stack Emissions.
15. Sri V. B. Chandrasekhara	Influence of deep excavation on adjoining structures.
16. Sri Girish Pathak	Tribological investigations in Mechanical Processing.
17. Sri Y. B. Joshi	Design of a Conceptual Data base on Information Science approach.

18. Ms. Maya Sen Gupta	Non Linear Optimization for some Constrained Deterministic and Stochestic facility locatioh problem through the development of Application Software.
19. Sri S. S. Mahli	Pharmacological Studies on purified Progamia seed oil, Karanjin, Pongamol and their Derivatives.
20. Sri U. K. Choubey	Efficacy of working together in Coal Industry.
21. Sri I. I. Joseph	Study for Higher Productivity in Coal Mining through Behavioural Approach.
22. Sri Atul Anand	Flexible Automation for competitive Manufacturing.
23. Sri Bijay Kumar Singh	Some Ergonomic considerations in work design.
24. Sri Neeraj Pandey	Computer Modelling and simulation of flow in Petroleum reservoir.
25. Sri R. P. Singh	Study of Flow behaviour in a cavity in an incompressible Flow.
26. Sri R. K. Singh	Studies on Elastic Buckling of Composite Plates.
27. Sri A. K. Thakur	High Temperature Oxidation and Erosion Behaviour of low Alloy Steels.
28. Sri A. K. Tiwari	The Influence of Crystal habit on the formation of Cotrimoxazole Suspensions.

STUDENT ACTIVITIES

During the year 1992-93, the students were given ample encouragement for participating in co-curriculars extracuccicular activities. Currently, there are more than twenty flourishing Student-Forums and Societies apart from the Athletics and Games. These societies cater to the widest possible range of extra-curricular activities for an alround development of the students personality.

Dramatic Society : The 'Stage' has been a proven and vital medium of expression. Dramatics Society provided to the students an opportunity to present serious theatre and play on one hand and a touch of humour and stire through monoact mimicry and skit.

Music Club : Provided a platform for development of musical talents in a large number of interested students in the areas of Indian Classical Music, Western Music and light Indian Music. It also provided opportunities to students for organising popular musical nites on the Campus during the cultural festivals. Students are also encouraged to participate in inter-language choirs so as to create feelings of national integration amongst the students.

Unesco Club: Under the auspicies of the Unesco Club the students participated in serious debates and quizzing. Interesting events like 'Just-a-minute' 'block and tackle' etc. were also organised by the club.

The Bhartiya Sahitya Parishad: is a forum for promoting cultural activities in the national language: the Parishad organised Kavi Sammelans, Mushaira, Folk dances, Creative writing and publications contests.

Photographic society: Expression and creativity through synthesis of ideas and color through a Camera or a canvas is an accepted truth and enjoyable pastime. Photographic Society provided ample opportunity to students interested in Camera or Darkroom/studio work. During the year the Soceity had over 200 members. There are a number of Dark-rooms with full facility for development and Printing of films in the Institute, and also in the residential Halls.

The Fine Arts Society: Looked after the generation of skills in using pencil, pastel, water and oil colors paints as well as sculpture and handicrafts. On the occasion of the Republic Day an on-the-spot competition was held by the society in which over 200 young artists including Campus children took part.

Bitian's Nature Club: An affiliate of the World Wide Fund for Nature has encouraged students participation to know and love, respond to and vibrate with the Nature in all the immensity and totality.

The Highlender's Adventure Club: Which is an affiliate of NAF and NTMC provided ample opportunity for the partici-pants to derive delight from adventure-hitch-hiking, cycle expeditions, rock climbing or mountaineering at no or very low cost.

Spic-Macay: The society for the promotion of Indian Classical Music and Culture amongst Youth had its fair share of activities by inviting famous exponents of Indian Classical Music and Dance.

The Audio Visual Education Club: While presenting recent and classic film every weekend for entertainment and relaxation of the students the Club also provided a number of technical and educational films and documentaries. The Club is very popular amongst all the residents of the campus.

Pooja Committee: Looked after the celebration of 'Saraswati Pooja' and "Vishwakarma Pooja' to promote the religious sentiments of the students and staff.

The Engineering Soceity: In the technical and scientific arena, the Engineering Society promotes the interest of the students in the design, development and complete fabrication of working engineering models. The society organised a number of technical talks by eminent Scientists and Engineers.

It is note-worthy that the various Engg. faculties with their concentrated extra curricular efforts have been encouraging fraternity and identity, through the societies/Clubs in their respective areas e.g. Electrical and Communications Engineering Society, Computer Engineering Society, Civil Engineering Society and Pharmaceutical Society etc. The students' chapter of the Institution of Electrical and Electronics Engineers (India) are also engaged in a variety of technical persuits.

The Amateur Radio Society: has a membership of over hundred students; these students are able to reach out all-over the world through intricate communication network under the Radio-HAM Society.

The Indian Association of College Going Scientists: bubbles with activities including organisation Technical trips to industrial areas, Seminars, technical quizzes, apart from initiating astronomical observations.

The News and Publication Society: While providing an opportunity for news reporting, Journalism and creative writing contributed substantially, bringing out the latest news in the regular issues of "Campus Times", "Sports Times" and in quarterly issues of the BIT by BIT.

Other Voluntary Clubs: The BIT chapter of Leo Club and Rotaract Club have a record of creditable performances.

GAMES AND SPORTS

Since inception, the Institute has placed emphasis on Games and Sports. Earlier this activity was organised as a co-curricular programme but from 1984 the Games and Sports have been provided in the regular curriculum of the Under-graduate Course by treating it as a full subject in the 1st and 2nd Semester of the B.E. and B.Pharm. Degree programme. Accordingly, the students are exposed to PT & Drill, Gymnastics etc. thrice a week and on the other days they are required to play the allotted Games. Suitable arrangement for training and participation of girl students has also been made and their participation in PT and Games is compulsory. Now-a-days, on an average over 50% of the students take part in the Games, Sports and Athletics on a regular basis.

Besides usual Intramural competitions, athletes and players of the Institute participated in the Inter-University Games & Sports Tournaments under the auspices of Association of Indian Universities organised at various Universities of the country.

'Pole Vault' Event of Eastern Zone Inter University Athletic Meet was organised at L.N.C.P.E. Gwalior, Jiwaji University; Shri Kanhaiya Lal, a student of 7th Semester, won the Ist place (Gold Medal).

The Eastern Zone 'Inter-University Basket Ball Tournament' was organised at B.I.T., Mesra; the Institute's team stood Third.

The Eastern Zone ('B') 'Inter University Football Tournament' was held at B.I.T., Mesra; the Institute's Football Team stood Fourth.

The 'Inter Technical Badminton Meet' was organised by I.I.T., Kharagpur; the Institute's Badminton Team won the Championship.

Besides the above, this year the Institute's Volleyball and Tennis Team also took part in the Inter University Tournament held at L.N. Mithila University, Darbhanga and S.K. University, Anantpur (A.P.).

The Institute organised Chetan Deoraj Memorial East Zone Inter Technical Cricket Cup Tournament which will be a permanent feature in years to come. B.I.T., Mesra won the Cup for the year 1992-93.

N.S.S. :

The number of active members has been increased to 33 including some students of higher semesters and Post-graduate programmes who joined the NSS voluntarily.

Night classes for the mess-boys were organised for different hostels. Books and stationery were distributed free of cost. Special medical camp was organised in which free medicines were also made available to the needy persons.

'Swami Vivekanand Jayanti' was celebrated as 'Rastriya Chetna Vars' on 19th January, 1993.

THE STUDENTS' HALLS OF RESIDENCE

The Institute is completely residential and all the students are required to stay in one of the Hostels or Halls of Residence numbered serially - as Hostel .1 to 7. In addition there are two separate Hostels one for girls and the other for foreign students. With the assistance from the U.G.C. and the State Government, one more Hostel for Girls has been constructed and will be ready for use from the next academic session.

All the hostels are laid out beautifully to match the screne and pleasant campus with flower beds, bushes and trees encompassing each hostels, besides the well maintained lawns in front. The architecture of the hostel includes central facilities like spacious Dining Halls in the Centre and Common Rooms and reading Rooms, placed symmetrically on both sides of the central entrance and wide varandahs all along the length with air gaps and balconies well set for common use.

Each student is accomodated in a single-seated room, furnished with a steel table and a steel chair. The girl students are kept in two-or-three furnished rooms. Each room is quite spacious with a big size window and a steel door oppositely placed to make the room airy. Each room has a cup-board, wardrobe and a wide and deep rack.

Each hostel has a Common Room, where Indoor Games are available. Each hostel has a Reading Room also - where sufficient number of Magazines, Periodicals and Newspapers by consensus are made available to the residents of the hostel. Provision of getting the old magazines and periodicals issued to students are available. Each hostel has also been provided with a Color Television Set.

Frequent competitions are organised among the inmates of the hostel in a number of indoor games. Inter-Hostel Tournaments in the indoor and outdoor games are a regular and very attractive feature of the hostel life.

Once in a year, the inmates organise a Hostel-Night, where in the improvised stage, well selected cultural and musical programme, games andspecial items based on intimate knowledge pack the evening with fun and exciting festive mood.

Each hostel has an independent Mess, completely managed by the students through Mess Committee members elected from among the residents themselves. The committee looks after the complete management including the Menu, preparation, purchases and billing under the supervision of the Superintendent/Assistant Superintendent of the hostel. The bills are made on 'no profit no loss' basis and the monthly bills of the residents are submitted in the Mess Accounts Office, where individual student pays accordingly. The menu and monthly bills of the various hostels are assessed and revised periodically in the Meeting of the Hostel Council.

NATIONAL CADET CORPS

A unit of the National Cadet Corps was set up in the Institute in 1957 for imparting technical as well as general training to the students. Initially, it functioned as an EME Sec. with a strength of 60 cadets. The seventies have been a period of serious student - unrest all over the State and consequently the NCC programme also suffered to a considerable extent. However, there was some revival in the early 'Eightees'. In order to encourage students' active participation in this programme in 1984 the Institute provided it in the regular curriculam with a weightage of '2 unit' equivalent to two courses of 100 marks each, in the 1st and 2nd Semester of the undergraduate B.E./B.Pharm. courses.

At present NCC unit is functioning as a full fledged Composite Technical Company of three different sections, viz. (i) Engineers Corps, (ii) EME Corps and (iii) Signal Corps, and its designation is "3 Bihar Comp. (Tech.) Coy., N.C.C., B.I.T., Mesra". It has a sanctioned strength of 200 Cadets.

The 3rd Bihar Comp. (Tech.) Coy of B.I.T., Mesra works under the command of a whole time Army Officer of the rank of Major or Lt. Colonel. In addition, it has on its staff three trained Associate NCC Officers who are Professors of the Institute, five P.I. Staff from the Army, about 8-10 clerical and other supporting Staff who are provided by the State Govt. Beside an administrative building on the main Campus the NCC has adequate facilities like Parade Grounds, Firing Range and Armament Stores, Library, Staff quarters etc.

The training programme is designed to lay stress upon the technical aspects of training in the form of Engg. Projects duly supported by lectures and practical classes (6 period/week); the training for Engineers Corps mainly covers Field Work, Field defence, Military Bridges, Roads and Aerodromes; Water supply, Demolition etc. The Technical training of EME Corps covers Inspection and repairs of vehicles, Driving practice and maintenance, Acquisition with different components of Automobiles, Mechanism and elementary principles of different class of army vehicles; and for the Signal Corps it covers Wireless equipment operation, Line equipment, Line transmission theory, Acquisition with More's code and handling or telegraphic instruments etc.

Apart from the technical training the NCC also provides general training to all cadets in order to inculcate the leadership qualities, high morals, unity, discipline etc. The NCC has special arrangement for training of those cadets who appear for 'B' and 'C' Certificate exam. of NCC (Tech.).

During the year 1992-93, 175 cadets were enrolled in the NCC Coy of the Institute - 70 in the Engineers Corps, 50 EME Corps, and 55 in the Signal Corps.

TRAINING AND PLACEMENT

During the last 6 - 8 months of each academic session, the Institute plays host to many senior executives from a large number of Organisations. They visit us to recruit technical and managerial personnel via interviews conducted on campus of our outgoing B.E., B.Pharm., M.E., M.Pharm., MBA, MCA and DCA students.

The visiting teams are mostly from the premier private companies, some Government Organisations and the Defence services. We are glad to mention that the visiting teams are invariably happy to see the facilities at the Institute, the environment and well-maintained surroundings, the general discipline and behaviour of the students and they are impressed by their technical aptitude and talent. We are proud to state that the demand for our graduates has been steadily growing, along with the reputation of the Institute.

The Training & Placement division interacts between the Organisations that wish to visit us, the students who need jobs and the Departments and faculty concerned, to try and best achieve the aspirations of the students and the requirements of the Organisations, also keeping the interests of the Institute in view. Apart from arranging Placement services, this division also encourages and tries to arrange industrial training for interested students during their vacations, at Organisations all over the country.

During the last 11 years, between 1500-1600 graduates would have received confirmed offers of appointment through campus recruitment, i.e., interviews held on campus, while still completing their studies. Other students have also benefited from their interview experiences on campus and consequent gain of confidence to obtain jobs on their own within a short time of graduating. Further, many thousand have undertaken vacation training, thereby enhancing their technical awareness and increasing their prospects of employment.

We are glad to mention that campus placement activities have shown a, by and large, continuously successful trend over the last ten years. This has been espically significant in view of the recession in Indian Industry for the last two years.

During the last academic session, 1992-93, we were visited by about 26 premier Organisations. By June 1993, most of these companies had intimated their final selections, offering about 175 appointments to graduates from different disciplines. About 20 students had received more than one offer. Some Organisations were expected to finalize or increase their selections later bringing the total number of appointments to about 190.

As in previous years, the biodatas of M.Pharm. and B.Pharm.students were again dispatched to various Pharmaceutical companies,in collaboration with the Department of Pharmaceutical Sciences. Some students were subsequently falled for interviews by these companies. The details of appointments are not known yet. Bio-datas of MBA, MCA, DCA, BE and ME students have also been similarly dispatched. Again, the details of selections are not known, but are expected to be satisfactory.

Placement activities continue on a small scale even after the end of the academic session. Those students who graduate without jobs are asked to leave their bio-datas, and these are later dispatched to Organisations who contact us after June, when the students have left the campus, for names and address of graduates. We also provide interested graduates with lists of addresses of appropriate industries, and advice and guidance in relevant matters.

During the year under report about 450-500 students received vacation training at various factories and establishments during the Puja vacations in 1992 and Summer vacations in May-June 1993.

We are glad to note that the Training & Placement division has acquired a small but adequate personal computer, and also that for the first time a placement brochure has been prepared to send along with our placement invitations.

The details of confirmed appointments offered to the outgoing students by the various Organisations during the year under report (upto June, 1993) and also the branch-wise number of appointments secured by the students is as follows:

DISCIPLINE/BRANCH	NUMBER OF JOBS
B.E.- Mechanical Engineering	50
Production Engineering	02
Electrical & Electronics Engineering	35
Electronics & Communication Engineering	25
Computer Science	21
Civil Engineering	07
M.E.	01
M.C.A.	02
M.B.A.	05

PLACEMENT SUMMARY 1992-93

Name of Organisation	No. of Placement
Bharat Petroleum Corporation Limited, Bombay	21
Bihar Caustics & Chemicals Ltd. Garhwa Road	02
Brittannia Industries Ltd. Bangalore/Calcutta	04
C M C, Calcutta	09

Name of Organisation	No. of Placement
Crompton Greaves Ltd., Bombay	03
Eicher Goodearth Ltd., New Delhi	03
Escorts, New Delhi	**
H C L - Hewlett Packard	07
Hindustan Motors, New Delhi	03
Hindustan Motors EED, Madras	02
Hindalco, Renukoot	04
INDAL, Muri	03
ITC Limited, Calcutta	**
ITW Signode, Hyderabad	04
Larsen & Toubro - ECC, Calcutta/Madras	13
National Engineering Industries, (N B C) Jaipur	04
Orissa Cements Ltd., Calcutta	**
Shriram Needle Bearings Ltd., Ranchi	**
T C S, Bombay/Calcutta	02
T E L C O, Jamshedpur	10
T I S C O, Jamshedpur	43
Tata Robins Fraser, Jamshedpur	06
Tinplate Company of India Ltd., Jamshedpur	06
Tata Metalliks, Kharagpur	06
Usha Steels & Alloys Division, Jamshedpur	**
Wipro Infotech Limited, Calcutta	07
Wipro Systems Limited, Bangalore	07

Note: ** means that the details of appointments, i.e., the results of the final interviews have not been received.

RURAL HOUSING DEVELOPMENT CENTRE

The Rural Housing development Centre is housed in Civil Engineering Wing of the Institute has been performing various complex functions. An important and specific function being a live partner alongwith the State Government in improving housing and environmental conditions of the tribal people located in Chotanagpur Tribal belt by developing appropriate technologies, and propogating technology transfer through field demonstrations for the construction of low cost dwellings.

Considering that special attention is required to be given for the improvement of housing and environmental conditions in the tribal settlements, the Rural Housing Development Centre has initiated socio-economic studies and engineering surveys of tribal settlements in different parts of the state to identify the specific problems and suggest appropriate solutions.

The main objective of the Centre is to promote research in the improved use of local materials and construction techniques using locally available labour force. Further, motivate rural people to construct their houses by material developed by the Centre. The extension activities like workshop, 'on low cost housing technologies and training programme for the executive personnel of the State is widely acclaimed and attended. So far 380 officers of the rank of Deputy Development Commissioners, Executive Engineers, Assistant Engineers, Block Development Officers, Junior Engineers have been benefited by this programme.

With a view to promote better understanding of low cost constructional technology a number of research projects has been initiated and completed.

ANNEXURE - I

BOARD OF GOVERNORS

Chairman	:	Shri G. P. Birla
Vice-Chairman	:	Dr. H. C. Pande
Members:		
Nominee of the Government of India, Ministry of Human Resource Development	:	Shri S. D. Awale
Nominee of the University Grants Commission	:	Prof. S. K. Sen
Nominee of the All India Council for Technical Education	:	Shri S. N. Chakraborti
Commissioner & Secretary Sc. & Tech., Govt. of Bihar	:	Shri A. K. Mishra
Commissioner & Secretary Education, Govt. of Bihar	:	Shri N. K. Agarwal
Commissioner, Chotanagpur Divn. (South), Bihar, Ranchi	:	Shri R. J. Pillai
Nominee of the Chancellor	:	Prof. Muchkund Dubey
Nominee of the Hindusthan Charity Trust	:	Shri C. K. Birla
" "	:	Shri A. L. Goenka
" "	:	Dr. H. C. Pande
Director, B.I.T., Mesra	:	Dr. J. Jha
Member of Institute Faculty	:	Dr. N. L. Munjal
" "	:	Prof. V. C. S. Rao
Member selected by the General Council	:	Shri D. N. Patodia
" "	:	Shri S. R. Jain
" "	:	Shri C. S. Jha
Secretary : Registrar & OSD	:	Shri J. B. Saksena

TECHNICAL COUNCIL

Chairman : Director, BIT, Ranchi	:	Dr. J. Jha
Members :		
Nominee of the Chancellor	:	Prof. M. Haroon
Director of Technical Education, Govt. of Bihar	:	Ex-Officio
Director of Higher Education Government of Bihar	:	Ex-Officio
Dean of Science Ranchi University	:	Ex-Officio
Dean of Engineering Faculty Ranchi University	:	Ex-Officio
Professors of the Institute	:	Dr. B. Kanta Rao Prof. A. K. Aggarwal Prof. K. P. Sinha Dr. C. B. Mishra Prof. G. P. C. Rao Dr. B. K. Razdan Dr. J. N. Mishra Dr. N. L. Munjal Prof. K. C. Pande Dr. B. S. Sahay Prof. J. S. Ruhela Dr. R. C. Gupta Dr. S. Kumar Prof. R. A. Sharma Prof. S. H. Kekre Prof. S. C. Goel Prof. B. S. Rajeevalochanam Dr. R. K. Shrivastava Dr. Ashok Misra Prof. Awadh Prasad Dr. A. K. Chatterjee Dr. K. N. Sahu Dr. R. C. Prasad Dr. M. N. Banerjee Dr. B. B. Mishra Dr. B. G. Varshney Dr. P. K. Mahanti Dr. D. K. Mukherjee Dr. J. Ram Dr. O. P. Sinha Prof. S. P. Bhatnagar

Professors of the Institute (Contd.)	:	Prof. B. P. Roy Dr. A. K. Sharma Dr. N. C. Mahanti Prof. A. P. Sinha Prof. B. G. Rao Prof. K. M. Sirbhaiya Prof. A. P. Singh Dr. S. N. Mehrotra Dr. J. Paul Prof. G. Sahay
Persons appointed by the Chairman vide Clause 4(e) of the Regulations	:	Prof. G. C. Singh Prof. M. K. Saxena Shri R. S. Yadav Dr. D. Jairath Shri R. P. Singh
Librarian (ex-officio)	:	Shri U. N. Singh
Controller of Examinations (ex-officio)	:	Dr. P. C. Joshi
Secretary : Registrar & OSD	:	Shri J. B. Saksena

FINANCE COMMITTEE

Chairman	:	Shri G. P. Birla
Members:		
Nominee of the University Grant Commission	:	Dr. C. P. Srivastava ,
Nominee of the Chancellor	:	Shri C. R. Venkatraman
Nominee of the Board of Governors	:	Shri A. L. Goenka
Nominee of General Council	:	Dr. H. C. Pande
Director, B.I.T., Ranchi	:	Dr. J. Jha
Treasurer,B.I.T.,Ranchi	:	Sri S. S. Jajodia
Member-Secretary:		
Registrar & OSD	:	**Shri J. B. Saksena**

BUILDING & WORKS COMMITTEE

Chairman:		
Director, B.I.T., Ranchi	:	Dr. J. Jha
Members:		
Assistant Director(Pln. & Dev.)	:	Prof. A. K. Agarwal
Assistant Director(Admn.)	:	Prof. K. P. Sinha
Treasurer,B.I.T., Ranchi	:	Shri S. S. Jajodia
Representative of the Architects:		M/s Kothari and Associates, Calcutta.
Representative of the State PWD	:	Shri B. K. verma Supdtg.Engineer,PWD,Ranchi
Head.Dept. of Civil Engg. B.I.T., Mesra	:	Prof. G. P. C. Rao
Member-Secretary:		
Registrar & OSD	:	Shri J. B. Saksena

EXECUTIVES AND DEPARTMENTAL HEADS/INCHARGES

Director - Dr. J. Jha

Treasurer - Shri S. S. Jajodia

Registrar & OSD - Shri J. B. Saksena

Assistant Directors :

(PG & Research) - Dr. B. Kanta Rao

(Planning& Dev) - Prof A.K. Agarwal

(Administration)- Prof. K. P. Sinha

Deans :

Curriculum Development - Dr. Ashok Misra

Students Activities - Prof. B.S. Rajeevalochnam

Chief Warden - Prof. A.P. Singh

Departmental Heads :

Civil Engg.	-	**Prof. G. P. C. Rao**
Computer Science	-	Dr. P. K. Mahanti
Electrical & Electronics Engg.	-	Dr. B. Kanta Rao
Electronics & Comm. Engg.	-	Prof. S. C. Goel
Mechanical Engg.	-	Dr. C. B. Mishra
Production Engg.	-	Prof. K. P. Sinha
Applied Chemistry	-	Dr. M. N. Banerjee
Applied Mathematics	-	Dr. B. B. Mishra
Applied Physics	-	Prof. K. C. Pande
Management	-	Prof. K. P Sinha
Pharmaceutical Sc.	-	Dr. B. K. Razdan
Space Engg & Rocketry	-	Dr. N. L. Munjal

Incharges :

Research Cell (Histroy of Science)	-	Dr. R. C. Gupta
Finance	-	Shri B. N. Mishra
Entrance Exams.	-	Prof. G. C. Singh
Trg. & Placement	-	Dr. D. Jairath
Physical Edu & Sports	-	Prof. R. S. Yadav
Library	-	Shri U. N. Singh
Examinations	-	Dr. P. C. Joshi
Nodal Centre	-	Prof. M. K. Saxena
Medical	-	Dr. (Mrs.) C. Mishra