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<td>22</td>
</tr>
</tbody>
</table>
1. ABOUT CIPET: IPT, BHUBANESWAR

CIPET: IPT – Bhubaneswar is one of the high learning centers of CIPET, a premier national institution under the aegis of Department of Chemicals and Petrochemicals, Ministry of Chemicals and fertilizers, Govt. of India. CIPET:IPT Bhubaneswar is an ISO 9001: 2015 certified institution having state of the art facilities for Plastics Processing, Tooling and mould manufacturing, product design using CAD/CAM/CAE and testing and quality control of polymeric materials and products with NABL accreditation and BIS recognition. CIPET: IPT Bhubaneswar is fully devoted to Skill Development, Technology Support Service, Academic & Research (STAR) to cater the needs of Plastics and allied industries in India and abroad.

CIPET: IPT Bhubaneswar offers the following AICTE approved undergraduate (UG) programs and postgraduate (PG) programs in engineering and postgraduate programs in science in affiliation with Biju Patnaik University of Technology (BPUT).

I. Undergraduate Programs (Engineering)
   a) B. Tech. in Plastics Engineering (PE),
   b) B. Tech. in Manufacturing Engineering and Technology (MET)

II. Postgraduate Programs (Engineering)
   a) M. Tech. in Plastics Engineering (PE),
   b) M. Tech. in Polymer Nanotechnology (PNT).

III. Postgraduate Programs (Science)
   a) M. Sc. in Materials science and Engineering (MSE) – 5 year integrated
   b) M. Sc. in Polymer Science (PS) – 2 years

ADMISSION RULES AND REGULATIONS:

1. Selection will be based on the candidates’ performance in Entrance Examination conducted by CIPET: IPT, Bhubaneswar. The candidate’s academic record of entry qualification will also be taken into consideration if needed.

2. The reservation rules for admissions are applicable as per Odisha Government / BPUT.

3. Hostel accommodation is available and allotment will be subjected to availability and on requirement basis for out-station students.
GENERAL INSTRUCTIONS:

- The application form must be filled online in English only.
- Inadequate information furnished in each relevant column of the application from would result in rejection of candidature.
- Candidates employed in Govt. sector should submit a “No Objection Certificate” from the employer along with the application.
- Give the complete and correct communication address in CAPITAL letters, e-mail ID, contact telephone number and mobile number.
- Please note that all the future informations will be made through postal communication/email / mobile number given in your application.

INSTRUCTIONS FOR APPLICATION:

1. The application fee is Rs. 500/- for general category and Rs. 250/- for SC/ST candidates. The application fee is payable using internet-banking, Phone pay, Google Pay, BHIM UPI, in favour of CIPET Bhubaneswar. The account details and IFSC of CIPET Bhubaneswar account are given in the online application form.
2. The details (UTI number, name of the candidate, Name of the program for which applied, date of payment etc.) of payment are to be filled in the online application form.

List of documents to be uploaded:

- One recent passport size photograph of size 3.5 cm × 4.5 cm
- Self-attested photocopy of entry qualification certificate (XII standard / Diploma / Degree Certificate / JEE Main rank card)

IMPORTANT DATES:

29.08.2020 Last date for filling on line application forms
31.08.2020 Date of Entrance Examination (CIPET: IPT BHUBANESWAR JEE)

Link for Online Application: https://www.cipet.gov.in/centres/cipet-bhubaneswar/ug_pg_advt.php
Scan QR Code to Visit Link Directly
2. DETAILS OF THE PROGRAMS AND ELIGIBILITY:

1. Details of eligibility in UG programmes

<table>
<thead>
<tr>
<th>Sl No</th>
<th>Program</th>
<th>Specialization</th>
<th>Duration</th>
<th>Entry Qualification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>B. Tech.</td>
<td>Plastics Engineering</td>
<td>4 years</td>
<td>Passed <strong>10+2 examination</strong> with Physics and Mathematics as compulsory subjects along with one of the Chemistry/Biotechnology/ Biology/ Technical Vocational subject/ Computer Science/ Information Technology/ Informatics Practices/ Agriculture/Engineering Graphics/ Business Studies. <em>Obtained at least 45% marks (40% marks in case of candidates belonging to reserved category) in the above subjects taken together.</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>OR</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>Passed Diploma (in Engineering and Technology) examination with at least 45% marks (40% marks in case of candidates belonging to reserved category) subject to vacancies in the First Year, in case the vacancies at lateral entry are exhausted.</strong></td>
</tr>
<tr>
<td>2</td>
<td>B. Tech.</td>
<td>Manufacturing Engineering &amp; Technology</td>
<td>4 years</td>
<td><strong>Diploma</strong> in Plastics Technology / Plastic Mould Technology / Mechanical Engg. / Chemical Engg. / Production Engg. / Automobile Engg. / Electrical Engg. / Electrical &amp; Electronics Engg. B. Sc. (Passed Mathematics in 10+2/12th examination). <em>Passed the above examination with at least 45% marks (40% marks in case of candidates belonging to reserved category)</em></td>
</tr>
</tbody>
</table>
## DETAILS OF THE PROGRAMS AND ELIGIBILITY:

2. Details of eligibility in PG programmes

<table>
<thead>
<tr>
<th>Sl No</th>
<th>Program</th>
<th>Specialization</th>
<th>Duration</th>
<th>Entry Qualification</th>
</tr>
</thead>
</table>
| 1     | M. Sc.            | Polymer Science        | 2 years  | **B. Sc.** with Chemistry / Industrial Chemistry / Polymer Science / Biopolymer science / Applied Chemistry / Industrial Polymer Chemistry.  
Any **B. Sc.** degree with chemistry as one of the subjects. |
| 2     | Integrated M. Sc. | Material Science & Engineering | 5 years  | Passed **10+2/12th examination** with Mathematics, Physics and Chemistry.  
OR  
Passed Diploma in Engineering courses having Physics, Chemistry, Mathematics & Engineering subjects conducted by SCTE&VT, Odisha  
Passed the above examination with at least 45% marks (40% marks in case of candidates belonging to reserved category) |
| 3     | M. Tech.          | Plastics Engineering   | 2 years  | **B. Tech.** in Plastics Engineering / Technology / Mechanical Engg / Production Engg. / Polymer Engg. / Chemical Engg. / Manufacturing Engg. / Metallurgical Engg. / Materials Science Engg. / Rubber & Plastics Technology  
**M. Sc.** in Polymer Science / Polymer Chemistry / Polymer Physics / Biopolymer science / Chemistry / Applied Chemistry.  
Obtained at least 50% marks (45% marks in case of candidates belonging to reserved category) in the qualifying Examination. |
| 4     | M. Tech.          | Polymer Nanotechnology | 2 years  |                                                                                                                                                      |
### 3. DETAILS OF THE ADMISSION PROCEDURE FOR EACH PROGRAM:

<table>
<thead>
<tr>
<th>Sl No</th>
<th>Program</th>
<th>Specialization</th>
<th>Admission Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>M. Sc.</td>
<td>Polymer Science</td>
<td>• Admission is based on the rank in CIPET: IPT BBSR JEE 2020.</td>
</tr>
</tbody>
</table>
| 2     | Integrated M. Sc. | Material Science & Engineering | • Admission for all India students is based on the rank in **JEE Main or rank in CIPET: IPT BBSR JEE 2020.**  
• Admission for Odisha domicile students is through OJEE counseling (Based on rank in **JEE Main or OJEE 2020**) |
| 3     | M. Tech | Plastics Engineering | • Admission for all India students is based on the GATE score / rank in CIPET: IPT BBSR JEE 2020.  
• Admission for Odisha domicile students is through OJEE counseling (Based on GATE score / OJEE 2020 – PGAT rank) |
| 4     | M. Tech | Polymer Nanotechnology | • *Admission for all India students is based on the rank in JEE Main**  
• Admission for Odisha domicile students is through OJEE counseling (Based on rank in JEE Main or OJEE 2020) |
| 5     | B. Tech | Plastics Engineering | • Admission for all India students is based on the rank in JEE Main or rank in CIPET: IPT BBSR JEE 2020.  
• Admission for Odisha domicile students is through OJEE counseling (Based on rank in JEE Main or OJEE 2020) |
| 6     | B. Tech | Manufacturing Engineering & Technology | • Admission for all India students is based on the rank in JEE Main or rank in CIPET: IPT BBSR JEE 2020.  
• Admission for Odisha domicile students is through OJEE counseling (Based on rank in JEE Main or OJEE 2020) |
| 7     | B. Tech. (Lateral Entry) | Plastics Engineering | • Admission for all India students is based on the rank in JEE Main or rank in CIPET: IPT BBSR JEE 2020.  
• Admission for Odisha domicile students is through OJEE counseling (Based on rank in JEE Main or OJEE 2020) |
| 8     | B. Tech. (Lateral Entry) | Manufacturing Engineering & Technology | • Admission for all India students is based on the rank in JEE Main or rank in CIPET: IPT BBSR JEE 2020.  
• Admission for Odisha domicile students is through OJEE counseling (Based on rank in JEE Main or OJEE 2020) |

*Admission for all India students is based on the rank in All India CIPET JEE exam based on vacancy.*
4. DETAILS OF FEES STRUCTURE:

I. Fees structure# for UG programme (B. Tech.)

<table>
<thead>
<tr>
<th>Particulars of Fee</th>
<th>B. Tech. (PE) (Regular)</th>
<th>B. Tech. (MET) (Regular)</th>
<th>B. Tech. (PE) (Lateral Entry)</th>
<th>B. Tech. (MET) (Lateral Entry)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount (Rs.) 1st Semester</td>
<td>27,000</td>
<td>27,000</td>
<td>27,000</td>
<td>27,000</td>
</tr>
<tr>
<td>Tuition fee per semester</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amount (Rs.) 3rd Semester</td>
<td></td>
<td></td>
<td>27,000</td>
<td>27,000</td>
</tr>
<tr>
<td>University Registration/</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>examination fee*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Admission fee</td>
<td>1500</td>
<td>1500</td>
<td>1500</td>
<td>1500</td>
</tr>
<tr>
<td>Amount (Rs.) 1st Semester</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lib fee</td>
<td>500</td>
<td>500</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td>Amount (Rs.) 3rd Semester</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alumni fee</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>Extra-Curricular</td>
<td>500</td>
<td>500</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td>Amount (Rs.) 1st Semester</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sports fee</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Amount (Rs.) 3rd Semester</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Practical record fee</td>
<td>250</td>
<td>250</td>
<td>195</td>
<td>195</td>
</tr>
<tr>
<td>Amount (Rs.) 1st Semester</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insurance fee per year</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Amount (Rs.) 3rd Semester</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Study mat.</td>
<td>1100</td>
<td>900</td>
<td>850</td>
<td>650</td>
</tr>
<tr>
<td>Amount (Rs.) 1st Semester</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caution money</td>
<td>500</td>
<td>500</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td>Amount (Rs.) 3rd Semester</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>31,700/-</td>
<td>31,500/-</td>
<td>31,395/-</td>
<td>31,195/-</td>
</tr>
</tbody>
</table>

II. Fees structure# for M. Tech. / M. Sc. / Integrated M. Sc.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount (Rs.) 1st Semester</td>
<td>30,000</td>
<td>30,000</td>
<td>17,500</td>
<td>17,500</td>
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<tr>
<td>Tuition fee per semester</td>
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<tr>
<td>University Registration/</td>
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<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>examination fee*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Admission fee</td>
<td>1500</td>
<td>1500</td>
<td>1500</td>
<td>1500</td>
</tr>
<tr>
<td>Amount (Rs.) 1st Semester</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lib fee</td>
<td>500</td>
<td>500</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td>Amount (Rs.) 1st Semester</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alumni fee</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>Amount (Rs.) 1st Semester</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extra-Curricular</td>
<td>500</td>
<td>500</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td>Amount (Rs.) 1st Semester</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sports fee</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Amount (Rs.) 1st Semester</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Practical record fee</td>
<td>195</td>
<td>195</td>
<td>65</td>
<td>195</td>
</tr>
<tr>
<td>Amount (Rs.) 1st Semester</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insurance fee per year</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Amount (Rs.) 1st Semester</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Study mat.</td>
<td>300</td>
<td>850</td>
<td>850</td>
<td>850</td>
</tr>
<tr>
<td>Amount (Rs.) 1st Semester</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caution money</td>
<td>500</td>
<td>500</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td>Amount (Rs.) 1st Semester</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>33,845/-</td>
<td>34,395/-</td>
<td>21,765/-</td>
<td>21,765/-</td>
</tr>
</tbody>
</table>

# Fees may change without any prior notification as per directives or requirements.

* Students selected for admission through CIPET: IPT BHUBANESWAR JEE 2020-21 have to pay University Registration fee including examination fee of Rs. 5450/- or as per University norms in addition to the above total fee.
III. Hostel fees

Room rent and establishment charges (per Semester): Rs.12,000/-

Caution deposit (Refundable): Rs.1000/-

Food expenses: As per actual on monthly basis.

Notes:

1. Hostel accommodation is available and the allotment will be subjected to availability and on requirement basis for outstation students.

2. The above fee structure will be applicable for the students to be admitted during the academic year 2020-21. Further, if any changes in the fee structure as per the directives or instructions of the state or central government / University / CIPET H.O. etc., will be applicable at the time of Admission.
5. PLACEMENT ACHIEVEMENTS:

<table>
<thead>
<tr>
<th></th>
<th>UG Programmes</th>
<th></th>
<th>PG Programmes</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(PE)</td>
<td>(MET)</td>
<td>(PE)</td>
<td>(PNT)</td>
</tr>
<tr>
<td>Placement %</td>
<td>92 %</td>
<td>89.23 %</td>
<td>87.5 %</td>
<td>81.78 %</td>
</tr>
<tr>
<td>No. of Recruiters</td>
<td></td>
<td></td>
<td>10 nos.</td>
<td></td>
</tr>
<tr>
<td>Maximum Package</td>
<td>Rs. 5.5</td>
<td>Rs. 3.38</td>
<td>Rs. 4.8</td>
<td>Rs. 2.30</td>
</tr>
<tr>
<td>(LPA)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average Package</td>
<td>Rs. 2.74</td>
<td>Rs. 2.21</td>
<td>Rs. 3.00</td>
<td>Rs. 2.23</td>
</tr>
<tr>
<td>(LPA)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

UG Programmes

- B. Tech. (PE)
- B. Tech. (MET)
- Integrated M. Sc. (MSE)

PG Programmes

- M. Tech. (PE)
- M. Tech. (PNT)
- M. Sc. (PS)
MAJOR CAMPUS RECRUITERS:

Reliance Industries Limited
Welspun Flooring
GF COSMO FILMS
Engineered to Enhance
SPL
Supreme Petrochem Ltd
Lohia Corp
Toshiba Machine
Best Partner of Leading Industries
Jindal Poly Films Ltd
undhra masterbatch
J J Plastalloy Pvt. Ltd
ALPLA
motan
colortronic
Rishi FIBC Solutions Pvt. Ltd.
SMT Machine Tools Pvt. Ltd.
Vijayneha Polymers Pvt. Ltd.
Shrinath Rotopack
ability industrials
Vaaman Engineers
VARROC Excellence
Yikas eotech Ltd
Rohtech
CTM India Ltd
ABHIJEET

RESEARCH & HIGHER STUDIES:

NIIST-CsIR
IMMT
IMM
National Chemical Laboratory
Washington State University
OSU
University of Warsaw
The Ohio State University
University of Ulm
6. INFRASTRUCTURE & FACILITIES @ CIPET: IPT, BHUBANESWAR:
7. STUDENTS’ ACTIVITIES:
SYLLABUS

for

CIPET: IPT BHUBANESWAR JEE, 2020-21
8. Syllabus for M. Sc. Polymer Science

Question Paper Pattern:

‘Multiple Choice’ type question
Total 100 Questions, Total Marks: 100, Duration: 2 Hours

A. Core Subjects: 60-70 Questions
B. English: 5-10 Questions
C. Mathematics: 5-10 Questions
D. General Knowledge and Current Affairs: 10-15 Questions

Syllabus:

A] CORE SUBJECTS
- Organic Chemistry
- Name Reactions
- Polymer Chemistry
- Chemical Kinetics and Photochemistry
- Functional Groups
- Spectroscopy.
- Hydrocarbons and their Halogen Derivatives.
- Atomic Structure, Chemical Bonding, & Periodic Properties.
- Bio-molecules.
- Qualitative and Quantitative Analyses
- Physical Chemistry and Analytical Chemistry

B] ENGLISH
- Grammar Verbal Reasoning
- Synonyms
- Antonyms
- Plurals
- Sentence Completion

C] MATHEMATICS
- Numerical Aptitude
- Menstruation
- Ratios and Proportion
- Average and Percentages
- Profit and loss

D] GENERAL KNOWLEDGE & CURRENT AFFAIRS
Syllabus for M. Tech. (Plastics Engg. / Polymer Nanotechnology)

Question Paper Pattern:

‘Multiple Choice’ type questions
Total 100 Questions, Total Marks: 100, Duration: 2 Hours

A. Branch Subjects: 40 - 50 Questions
B. Engineering Mathematics: 10 - 15 Questions
C. English: 5-10 Questions
D. Analytical and Logical Reasoning: 10 - 20 Questions
E. General Knowledge and Current Affairs: 10-15 Questions

Syllabus:

A. BRANCH SUBJECTS


Chemistry: Chemical bonding atomic structure, organic chemistry, name reactions, physical chemistry, Chemical kinetics, Spectroscopy.


B. ENGINEERING MATHEMATICS

- Ordinary Differential Equations
- Linear Algebra
- Fourier series
- Laplace Transform
- Complex Analysis
- Numerical Methods
- Probability and Statistics
C. ENGLISH
- Grammar Verbal Reasoning
- Synonyms
- Antonyms
- Plurals
- Sentence Completion

D. ANALYTICAL AND LOGICAL REASONING

E. GENERAL KNOWLEDGE & CURRENT AFFAIRS
Syllabus for Integrated M. Sc. (Material Science & Engg.)

Question Paper Pattern:

‘Multiple Choice’ type questions
Total 100 Questions, Total Marks: 100, Duration: 2 Hours

A. Physics: 15-30 Questions
B. Chemistry: 15-30 Questions
C. Mathematics: 15-30 Questions
D. English: 5 -10 Question
E. General Knowledge and Current Affairs: 10-15 Questions

Syllabus:

A. PHYSICS

- **Physical world and Measurement:** Physics and its scope, Physics, Technology and Society. Measurement, need for measurement, units of measurement, fundamental and derived units, SI Units, accuracy and precision of measuring instruments, errors in measurement, absolute, relative error, percentage of error, Combination of errors, significant figures

- **Characteristics of Materials:** Elastic and Plastic behaviors of solids, Elastic limit, Hooke’s law. Young’s modulus, Shear and Bulk modulus, Poisson’s ratio

- **Electricity & Magnetism:** Coulombs law and conservation of charge, electric flux, Gauss law and its applications. Ohm’s law, Variation of resistance of metallic conductors with temperature

- **Atomic and Nuclear Physics:** Bohrs atomic model, expression for radius, velocity, energy, frequency of an electron in nth orbit. Rydberg constant and Hydrogen spectra. Einstein photoelectric equation, dual nature of radiation and DE Broglie wavelength. Mass energy equivalence relation (Statement only). Atomic nucleus, nuclear forces, nuclear mass, binding energy, mass defect, artificial radio activity, radio isotopes and their uses. Nuclear fission, energy released during nuclear fission, chain reaction, controlled chain reaction, nuclear fusion, energy generation in the Sun, and radiation hazards.

B. CHEMISTRY

- **Solid State:** Characteristics, Classification, Solubility, Melting points, Crystal structure of simple ionic compounds, Density calculation

- **Solutions:** Types, concentration and different ways of expressing concentration (% , ppm, strength, normality, molarity, molality and formality); Interrelations
• **Gaseous State:** Gas laws, Kinetic model of gases, ideal gas equation, Van der waals’ equation, compressibility factor, Average, root mean square and most probable velocities

• **Basic Concepts of Chemistry (Atoms and molecules):** Symbols, Valency, Atomic mass, Molecular mass

• **Structure of atoms and molecules:** Fundamentals particles and their properties, Rutherford and Bohr’s models of atom, defects of Bohr’s model, Heisenberg’s uncertainty principle. Shells and Sub-shells, s, p and d orbitals, Quantum numbers, Chemical bonds: Ionic, Covalent, Coordinate and Hydrogen bond, Hybridization – sp, sp2, sp3, dsp2, dsp3, d2sp3 shapes of molecules

• **Organic chemistry:** Functional Groups and organic radicals, Nomenclature by IUPAC system (substitutive method), Isomerism (Structural and stereoisomerism Optical and geometrical) Electron mobility – Inductive effect, Resonance, Electromeric effect and Hyperconjugation; their applications. Types of organic reactions – addition, substitution, elimination reactions. Idea of electrophiles and nucleophiles

C. **MATHEMATICS**

• **Continuity and Differentiability:** Continuity and differentiability, derivative of composite functions, chain rule, derivatives of inverse trigonometric functions, derivative of implicit functions. Concept of exponential and logarithmic functions

• **Differential equations:** Definition, order, degree of a differential equation, General and particular solution of a differential equation, Formation of a differential equation, Solution of a differential equations by method of separation of variables, Homogeneous differential equations of first order and first degree, Linear differential equations of the form \( \frac{dy}{dx} + p(x)y = q(x) \),

• **Integrals:** Integration as inverse process of differentiation. Integration of a variety of functions by substitution, by partial fractions and by parts

• **Sequence and Series:** Definition, Infinite geometric series, Arithmetico-geometric series, Exponential and Logarithmic series, Geometric mean between two given numbers, Relation between AM and GM

• **Vectors:** Vectors and scalars, addition of vectors, components of a vector in two dimensions and three dimensional space, scalar and vector products, scalar and vector tripleproduct.

• **Determinants and matrices:** Determinants and matrices up to third order, Minors and cofactors, Properties of determinants, Matrices upto third order, Types of matrices, algebra of matrices, properties of determinant, evaluation of
determinants, Adjoint and inverse of matrix, Application of determinants and matrices to the solution of linear equations (in three unknowns)

- **Trigonometry**: Compound angles, Multiple and Submultiple angles, Trigonometric identities Solution of trigonometric equations, trigonometric functions, Properties of triangles, Inverse trigonometric function and their properties

- **Co-ordinate geometry of two dimensions**: Cartesian system of rectangular co-ordinates in a plane, distance formula, section formula, locus and its equation, translation of axes, slope of a line, parallel and perpendicular lines, intercepts of a line on the coordinate axes. Various forms of equations of a line, intersection of lines, angles between two lines,

- **Probability**: Conditional probability, multiplication theorem on probability. Independent events, total probability, Baye’s theorem, Random variable and its probability distribution, mean and variance of random variable. Independent (Bernoulli) trials and Binomial distribution

**D. ENGLISH**
- Grammar Verbal Reasoning
- Synonyms
- Antonyms
- Plurals
- Sentence Completion

**E. GENERAL KNOWLEDGE & CURRENT AFFAIRS**
Syllabus for Lateral Entry to B. Tech. (PE/MET)

Question Paper Pattern:

‘Multiple Choice’ type questions
Total 100 Questions, Total Marks: 100, Duration: 2 Hours

A. Engineering Mathematics: 15-30 Questions
B. Engineering Mechanics: 15-30 Questions
C. Chemistry: 20-30 Questions
D. English: 10-15 Questions
E. General Knowledge And Current Affairs: 10-15 Questions

Syllabus:

A. ENGINEERING MATHEMATICS
   - **Determinants** - Expansion of determinants up to third order - properties of determinants - Solution of simultaneous equations using Cramer's rule
   - **Matrices** - Definition - Types of matrices - Operations on matrices
   - **Analytical Geometry**: Distance formula, Division formula, Area of trapezium, Area of Triangle, Equation of straight lines in different form, Distance of a point from a line, Equation of circle in different forms
   - **Vector Algebra**: Definition, Algebra of vectors, Position Vector, Resolution of vector into components, normal vector, unit vector, Scalar and Vector, Vector products and application, scalar triple product and application
   - **Probability and Statistics**: Measures of central tendency (Mean, Median, Mode), Measures of dispersion (Mean Deviation, Standard Deviation and Variance), Definition of probability, equally likely, mutually exclusive and independent events. Addition theorem of probability

B. ENGINEERING MECHANICS
   - **Force and Moments**: Force and its effects, Classification of forces, Principle of Transmissibility, Principle of Superposition
   - **Center of Gravity and Moment of Inertia**: Centroid and Center of Gravity (C.G.), Expression for C.G. of straight line, triangle, rectangle, circular, semicircular lamina. Expression for C.G. of solids like hemisphere and cone
   - **Friction**: Frictional force, angle of friction, limiting friction, co-efficient of friction, Laws of Static Friction. Simple problems on ladder, Body on Inclined planes with applied force parallel to the plane and horizontal, Screw Jack
• **Simple Stress and Strain:** Stress, strain, tensile, compressive and shear types of stress and strain, Hooke’s Law of elasticity, Poisson’s ratio, Elastic limit, Elastics constants (E, G & K) relationship between E,G &K, Stress- strain curve and salient points on stress-strain curve for ductile material.

C. CHEMISTRY

• **Solid State:** Characteristics, Classification, Solubility, Melting points, Crystal structure of simple ionic compounds, Density calculation

• **Solutions:** Types of solutions, concentration and different ways of expressing concentration (percentage, ppm, strength, normality, molarity, molality and formality); Interrelations

• **Gaseous State:** Gas laws, Kinetic model, ideal gas equation, Van der waals’ equation, compressibility factor, Average, RMS and most probable velocities

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• **Structure of atoms and molecules:** Fundamentals particles and their properties, Rutherford and Bohr’s models of atom, defects of Bohr’s model, Heisenberg’s uncertainty principle. Shells and Sub-shells, s, p and d orbitals, Quantum numbers,

• **Chemical bonds:** Ionic, Covalent, Coordinate and Hydrogen bond, Hybridisation- sp, sp², sp³, dsp²,dsp³, d²sp³ shapes of molecules

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• **Material Science:** Mechanical properties of material - Magnetic and Dielectric materials – Conductor and Semiconductor materials.

D. ENGLISH

• Grammar Verbal Reasoning
• Synonyms
• Antonyms
• Plurals
• Sentence Completion

E. GENERAL KNOWLEDGE & CURRENT AFFAIRS
SAMPLE QUESTIONS

for

CIPET: IPT BHUBANESAR JEE, 2020-21
9. Sample Questions for M. Sc. (Polymer Science)

1. Monomers required for the manufacturing of nylon 6,6
   a) adipic acid, hexamethylenediamine
   b) adipic acid, ethylene glycol
   c) sebacic acid, hexamethylenediamine
   d) succinic acid, hexamethylenediamine

2. 15 g of octane is burned and used to heat 50 cm$^3$ of water by 15 °C. What is the amount of energy transferred to the water? Assume a water density of 1 g cm$^{-3}$ and a specific heat capacity of 4.18 J g$^{-1}$ K$^{-1}$.
   a) 940 J
   b) 3135 J
   c) 940 kJ
   d) 3135 kJ

3. Soda lime glass is produced by fusing SiO$_2$ with __________
   a) CaO and B$_2$O$_3$,
   b) Al$_2$O$_3$ and CaO,
   c) B$_2$O$_3$ and Fe$_2$O$_3$,
   d) Na$_2$O and CaO.

4. Which of the following pairs do not show similar chemical properties?
   a) Fluorine-Argon,
   b) Beryllium-Aluminum,
   c) Boron-Silicon,
   d) Lithium-Magnesium

5. An electrophilic aromatic substitution reaction catalyzed by Lewis-acid gives alkylated aromatic products as illustrated below. Which organic name reaction is this?

   ![Reaction Diagram]

   a) Williamson Synthesis,
   b) Witting reaction,
   c) Friedelcrafts reaction,
   d) Wurtz reaction.
6. Which of the following does not travel in a vacuum?
   (a) Radio waves,
   (b) Gamma rays,
   (c) Magnetic waves,
   (d) Sound waves

7. The population of a town was 10,000 in January, 2018. It is estimated that the population will increase by 10% each year. What will be population of the town in January, 2020?
   a) 12,000
   b) 12,200
   c) 12,100
   d) 12,300

8. More than 2 lakh students_______up to two years preparing for the Common Admission Test all in the attempt to_______a seat at one of the top Business Schools in the century?
   a) read, fetch
   b) wait, go
   c) spend, secure
   d) study, take

9. The state-of-the-art school is with a medical clinic and fitness center.
   a) Establishes,
   b) Illustrative,
   c) Having,
   d) Equipped

10. Which organization has collaborated with ICMR to deliver COVID-19 test kits to 200 labs throughout the country?
    a) India Post,
    b) FedEx,
    c) DTDC,
    d) First Flight
Sample Questions M. Tech. (Plastic Engg. / Polymer Nanotechnology)

1. Six persons A, B, C, D, E and F are standing in a circle. B is standing between F and C. A is standing between E and D. F is standing to the left of D. Who is standing between A and F?
   a) B
   b) C
   c) D
   d) E

2. A is the son of B. B’s sister C has a son D and a daughter E. F is the maternal uncle of D. How is E related to F?
   a) Sister
   b) Mother
   c) Cousin
   d) Niece

3. Please do not laugh__________those beggars
   a) for
   b) against
   c) at
   d) from

4. Which of the following diseases are related to coronavirus?
   a) MERS
   b) SARS
   c) Both a and b
   d) Neither a nor b

5. Benzene reacts with chlorine in sunlight to give a final product
   a) C₆H₅Cl
   b) C₆Cl₆
   c) C₆H₆Cl₆
   d) CCl₄
6. The number of electrons in the valence shell of the central atom of a molecule is 8. The molecule is
   a) BeH₂
   b) SCl₂
   c) SF₆
   d) BCl₃

7. Which metal has a greater tendency to form metal oxide?
   a) Cr
   b) Fe
   c) Al
   d) Ca

8. The body centered cubic (BCC) lattice is found in
   a) Aluminium
   b) Copper
   c) Cadmium
   d) Tungsten

9. Tensile strength of steel is increased by addition of
   a) Manganese
   b) Sulphur
   c) Phosphorous
   d) Carbon

10. The resultant of two forces P and Q acting along the same straight line and in same direction is
    a) 2P+Q
    b) P+2Q
    c) P+Q
    d) P-Q
Sample Questions Integrated M. Sc. (Material Science & Engg.)

1. The force acting between two point charges can be computed using which of the following laws?
   a) Ohm's Law
   b) Ampere's Law
   c) Coulomb's Law
   d) Newton's Second Law

2. The S.I. unit of temperature is
   a) Fahrenheit
   b) Celsius
   c) Kelvin
   d) Reaumur

3. The proportion of lateral strain to longitudinal strain is known as
   a) Spring constant
   b) Young’s modulus
   c) Poisson’s ratio
   d) Engineering strain

4. Which of the following is a crystalline solid?
   a) Glass
   b) Plastic
   c) Rubber
   d) Sugar

5. Which of the following concentration expressions is defined as the number of moles of solute per kilogram of solvent?
   a) Molarity
   b) Molality
   c) Normality
   d) All of the above
6. The bond angle in a molecule having sp hybridization is
   a) 90°
   b) 109.5°
   c) 120°
   d) 180°

7. \[\int \cos x \, dx\] is equal to
   a) cosec x
   b) tan x
   c) sin x
   d) sec x

8. PLACID meaning
   a) Clear
   b) Calm
   c) Enjoyable
   d) Dull

9. ‘Lavani’ is the folk dance of
   a) Punjab
   b) Tamil Nadu
   c) Maharashtra
   d) Jharkhand

10. Which of the following diseases are related to coronavirus?
    a) MERS
    b) SARS
    c) Both a and b
    d) Neither a nor b
Sample Questions B. Tech. (LATERAL ENTRY)

1. Matrices obtained by changing rows and columns is called
   a) Rectangular matrix
   b) transpose matrix
   c) Symmetric matrix
   d) None of Above

2. What is the probability of getting 4 in a single toss of a die
   a) 1/5
   b) 1/8
   c) 1/4
   d) 1/6

3. What is the volume of a sphere of radius "R"?
   a) \( \frac{4}{3} \pi R^3 \)
   b) \( \frac{1}{3} \pi R^3 \)
   c) \( \frac{4}{3} \pi R^2 \)
   d) \( \frac{1}{2} \pi R^2 \)

4. The friction experienced by a body when it is in rest known as __________
   a) Limiting Friction
   b) Static Friction
   c) Kinetic Friction
   d) Co-efficient of friction

5. The moment of inertia of a solid sphere of mass ‘m’ and radius ‘r’ is
   a) \( 2mr^2/3 \)
   b) \( 2mr^2/5 \)
   c) \( mr^2 \)
   d) \( mr^2/2 \)
6. Bulk modulus of elasticity is
   a) Tensile stress / Tensile strain
   b) Shear stress / Shear strain
   c) Tensile stress / Shear strain
   d) Normal stress on each face of cube / volumetric strain

7. One megabyte is equivalent to?
   a) 1000 Bytes
   b) 1024 Kilo Bytes
   c) 1000 kilo Bytes
   d) 1024 Bytes

8. Which organization has collaborated with ICMR to deliver COVID-19 test kits to 200 labs throughout the country?
   a) India Post
   b) FedEx
   c) DTDC
   d) First Flight

9. Which is the ground-state electronic configuration of chlorine?
   a) \( 1s^22s^22p^5 \)
   b) \( 1s^22s^22p^63s^23p^4 \)
   c) \( 1s^22s^22p^63s^23p^5 \)
   d) \( 1s^22s^22p^83s^23p^5 \)

10. ARTIFICIAL (Choose the appropriate Antonym)
    a) Synthetic
    b) Unnatural
    c) Factious
    d) Natural
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