



I B.Tech I Sem Supply Examination, December 2021

CHEMISTRY
(EEE, CSE & IT)

Time: 3 Hours.**Max. Marks: 70**

Note: 1. This question paper contains two parts A and B.

2. Part- A is Compulsory. Answer all Questions which carries 20 marks.

3. Part – B consists 5 units. Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART- A**(10*2 Marks=20Marks)**

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|-------|--|----|-----|----|
| 1. a) | How do you express bond order? Calculate bond order for N ₂ molecule. | 2M | I | I |
| b) | What are the characteristics of bonding molecular orbitals | 2M | I | I |
| c) | Which salts are responsible for temporary and permanent hardness? Mention the methods for their removal. | 2M | I | I |
| d) | Scales formation in boilers can be prevented by phosphate conditioning. Explain | 2M | II | V |
| e) | Give an expression for calculating pH of a solution using glass electrode | 2M | III | IV |
| f) | How does Aluminium, Zinc, Tin protect metals from corrosion. | 2M | III | I |
| g) | What are enantiomers? Write the enantiomers of lactic acid | 2M | I | IV |
| h) | S _N 2 reaction results in inversion of configuration of the product. Justify with suitable example. | 2M | IV | V |
| i) | CO ₂ is a linear molecule, but IR active. Justify | 2M | V | V |
| j) | Define absorbance, transmittance and extinction coefficient. | 2M | V | I |

PART - B**(5*10 Marks=50Marks)****UNIT-I**

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|------|--|----|---|----|
| 2 a) | Draw energy level diagrams for O ₂ and N ₂ molecules | 5M | I | VI |
| b) | Explain about conductors and insulators on the basis of band theory | 5M | I | V |

OR

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|------|---|----|---|---|
| 3 a) | Explain salient features of molecular orbital theory | 5M | I | V |
| b) | Give reason for crystal field splitting of 'd' orbitals? Explain crystal field splitting of 'd' orbitals in tetrahedral field | 5M | I | I |

UNIT-II

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|------|---|----|----|----|
| 4 a) | A sample of water on analysis gave the following results Mg(HCO ₃) ₂ = 7.3 ppm, MgCl ₂ = 9.5 ppm, Ca(HCO ₃) ₂ = 16.2 ppm, CaSO ₄ = 13.6 ppm. Calculate temporary, total and permanent hardness of water in mg/L and ° Cl. | 5M | II | IV |
| b) | How ion-exchange process is carried out? How exhausted resins are regenerated? | 5M | II | II |

OR

- 5 a) How do you estimate hardness of water by EDTA complexometry 5M II I
 b) Explain any three internal conditioning methods for boiler treatment 5M II V

UNIT-III

- 6 a) How do you construct a calomel electrode? Give its working and applications and Zinc protects ion sacrificially. Illustrate with examples. 10M III II

OR

- 7 a) Differentiate primary and secondary batteries. Give examples for each. 5M III V
 b) Cathodic protection saves metal from corrosion. Justify 5M III V

UNIT-IV

- 8 a) How HBr adds to unsymmetrical propene. Explain the mechanism of addition and KMnO_4 is a powerful oxidising agent. justify 10M IV V

OR

- 9 a) With the help of energy level diagram explain various conformations of n-butane. 5M IV VI
 b) Chromic acid helps in the oxidation of alcohols to carbonyl compounds. Explain with suitable examples. 5M IV V

UNIT-V

- 10 a) What is the principle of uv-visible spectroscopy? How is it used in quantitative analysis? 5M V I
 b) What is MRI? Give its significance in medical field. 5M V III

OR

- 11 a) What type of electronic transitions are observed in saturated hydrocarbons, alkenes, alkyl halides, carbonyl compounds? Explain with examples. 5M V V
 b) Outline the selection rules to be followed in uv-visible spectroscopy. 5M V II

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