

QP Code : 75513

(3 Hours)

[Total Marks : 75

- N. B. :** (1) All questions are compulsory.
(2) **Figures** to the **right** indicate **full** marks.
(3) Please check, whether you have got the right question paper.

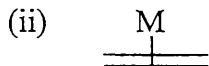
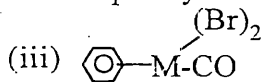
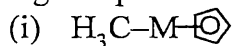
1. Attempt any **five** of the following :- 15
- (a) Draw resonating structures of sulphate ion and comment on its stability.
 - (b) What is irreducible representation? Mention it's properties.
 - (c) Explain the mechanism of inner sphere electron transfer reaction in complexes using suitable example.
 - (d) Give one method of preparation of bis (triphenyl phosphine) diphenyl acetylene platinum (o) and discuss it's structure.
 - (e) Explain the chemical vapour transport method of preparation of inorganic solids.
 - (f) Give the composition and important uses of Duralumin.
 - (g) What are phosphazenes? Give the structure of any two phosphazenes.
 - (h) Give any two advantages of natural gas as a fossil fuel.
2. (a) Explain the structure and bonding of the following on the basis of Valence Bond Theory : 6
- (i) PF_5
 - (ii) $[TeF_5]^-$
- OR**
- (a) Using the concept of hybridization, derive the wave function of hybrid orbitals involved in 'sp³ hybridization. 6
 - (b) Construct group multiplication table for C_{2v} point group. 5
 - (c) Obtain matrix representation for the following : 4
 - (i) Rotation operation.
 - (ii) Identity operation.
- OR**
- (c) Describe the various types of hydrogen bonding using suitable examples for each type. 4
3. (a) Define trans-effect and explain the electrostatic polarisation theory of trans-effect. 6

OR

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- (a) Define ligand hapticity. Find out the hapticity of each ligand on following complexes. 6



- (b) Discuss the structure and bonding in dibenzene chromium on the basis of Valence Bond Theory. 5
- (c) Explain the mechanism of outer sphere reaction using an example. 4

OR

- (c) Give one method of preparation of Zeise's salt. Describe its structure and bonding. 4

4. (a) Describe the sol-gel method of the preparation of inorganic materials by giving a suitable example. What are its merits and demerits? 6

OR

- (a) Discuss the structure and salient features of CaF_2 and TiO_2 6
- (b) With reference to Vanadium metal, discuss 5
- (i) one method of extraction.
- (ii) two important applications.
- (c) What are alloys? Give the components and important uses of 4
- (i) Brass.
- (ii) Stainless Steel

OR

- (c) Explain the variable oxidation state and magnetic properties of manganese group of elements. 4

5. (a) Discuss the classification of carbides? How do different types of carbides differ from each other? 6

OR

- (a) Give the classification of boranes. Explain the structure of B_4H_{10} on the basis of Wade's rule. 6
- (b) How does Mercury poisoning manifest itself in human body? 5
- (c) Discuss the use of solar energy in water heating and in the production of electricity. 4

OR

- (c) Explain the passive transport mechanism of metabolites across the cell membrane. 4