

QP Code : 76035

(3 Hours)

[Total Marks : 100

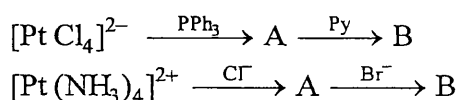
- N. B. : (1) All questions are compulsory.
(2) Figures to the right indicate full marks.
(3) Please check, whether you have received the right question paper.

1. Attempt any five of the following :- 20
- (a) Draw and explain the resonating structures of the following :-
(i) CO_3^{2-}
(ii) NO
- (b) State the conditions followed by a set of elements to form a group.
- (c) Define rate of reaction. Explain the following two factors affecting rate of reaction :
(i) Nature of leaving group
(ii) Charge of the complex
- (d) Give one method of preparation of dibenzene chromium. Explain its structure and bonding.
- (e) Discuss the precursor method of preparation of inorganic materials.
- (f) Give any four applications of Tungsten.
- (g) Discuss the structure of tri-iodide and penta-iodide ions.
- (h) How electricity is generated from solar energy? Illustrate with two examples.
2. (a). Derive the mathematical expression for wave functions of hybrid orbitals involved in sp^3 hybridisation. 7
- OR**
- (a) On the basis of Valence Bond Theory, explain the structure and bonding of the following : 7
(i) $[\text{TeF}_5]^-$
(ii) PF_5
- (b) Obtain the matrix representation for the following : 6
(i) Rotation operation
(ii) Identity operation
- (c) Describe the character table for C_{2v} point group. 7
- OR**
- (c) Discuss "odd electron molecules" giving two examples. 7
3. (a) Explain the mechanism of outer sphere electron transfer reaction in co-ordinate complexes with a suitable example. 7

OR

[TURN OVER

- (a) How is Zeise's salt prepared? Discuss its structure and bonding. 7
- (b) Explain the mechanism of hydroformylation of alkenes using an organometallic compound. 6
- (c) What is trans effect? Identify the products 'A' and 'B' in the following reactions. 7



OR

- (c) Give two methods of synthesis of ferrocene. Describe its structure and explain the bonding on the basis of Valence Bond Theory. 7
4. (a) Explain the chemical vapour transport method for the preparation of inorganic solids. Mention its merits and demerits. 7

OR

- (a) Discuss the structure and salient features of TiO_2 and CdI_2 . 7
- (b) With reference to Titanium, explain the following : 6
- two ores with the formula
 - one method of extraction
- (c) Define alloy. Give the composition and important uses of 7
- Wood's metal
 - Babbit metal

OR

- (c) With reference to Nickel group metals, discuss the following : 7
- Magnetic behaviour.
 - Oxidation states.

5. (a) What are phosphazenes? Mention its various types? Explain the structure of any one type of phosphazene. 7

OR

- (a) How are boranes classified? On the basis of Wade's rule, explain the structure of any two boranes. 7
- (b) Discuss the sources, toxicology and toxicity of Arsenic. 7
- (c) Explain the passive transport mechanism of metabolites across the cell membrane. 6

OR

- (c) How is oil recovered from oil shales? Give the environmental impact of oil shales. 7