

This question paper contains 4 printed pages]

Your Roll No.....

1260

B.Sc. (Hons.)/III A

CHEMISTRY

Paper XIV—Inorganic Chemistry—IV

Time : 3 Hours

Maximum Marks : 38

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt *Five* questions in all, including

Question No. 1 which is compulsory.

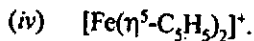
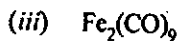
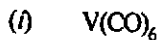
1. (a) Explain the term 'active transport' with respect to the working of Na/K pump in animal cells. Illustrate diagrammatically the mechanism of the working of Na/K pump. 4
- (b) What is meant by synergic effect ? How does it account for the formation of carbonyl complexes of transition metals in low oxidation states ? Does the synergic effect also play a role in strengthening the platinum-carbon bond in Zeise's salt. 4

P.T.O.

- (c) How can it be shown that Jander's scheme of autoionization of liquid sulphur dioxide is incorrect ? 2
2. (a) What are the functions of haemoglobin and myoglobin ? What changes occur in the heme groups of hemoglobin on going from deoxy-to oxy form ? 3
- (b) Give *two* reactions of ferrocene. Which shows it is more reactive than benzene. 2
- (c) Explain the role of calcium in protein folding mechanism. 2
3. (a) Zinc (II) ion is considered one of the most versatile catalysts in biological systems. Elaborate. 2
- (b) Explain the structure of methyl lithium. 2
- (c) Explain why direct nitration of ferrocene is not possible ? How can you get nitroderivative of ferrocene ? 2
- (d) Why does a solution of Grignard reagent conduct electricity ? 1
4. (a) Where and in what form is iron stored in the human body ? How is it taken from the storage sites to the sites for incorporation into haemoglobin ? 3

(b) Explain why the IR stretching frequency for C-O bond in metal carbonyls decreases with increasing negative oxidation state of metal atom. 2

(c) Give the valence electron count of the metal atom(s) for the following : 2



5. (a) With the help of equations explain what happens in any *three* of the following : 3

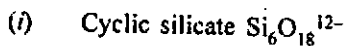
(i) Sulphur is treated with $NH_3(l)$.

(ii) Phosphorous pentachloride is treated with $SO_2(l)$.

(iii) HgI_2 is treated with KI in liquid sulphur dioxide.

(iv) Reaction between ammonium iodide and bismuth nitride in liquid ammonia.

(b) Draw the structure of the following : 3



- (c) What is a chain stopping and chain building unit in silicone chemistry ? 1
6. (a) Discuss the acidic/basic behaviour of acetic acid, urea and ammonium chloride in liquid ammonia as solvent and compare their behaviour in water. Explain the difference, if any, in each case. 3
- (b) Explain the role of *cis* platin in cancer therapy. 2
- (c) Why is the nature of π -bonding in borazine different from that in benzene ? How does it affect the reactivity of borazine ? Give *one* specific example. 2
7. (a) Explain the role of $\text{Na}_2\text{O}_2/\text{H}_2\text{O}$ or $\text{H}_2\text{O}_2/\text{NaOH}$ reagents in separation of $\text{Fe}(\text{OH})_3$ from $\text{Al}(\text{OH})_3$ and $\text{Cr}(\text{OH})_3$ in group III of the cation analysis scheme. 2
- (b) Differentiate between coprecipitation and post-precipitation by taking suitable examples. 2
- (c) Explain the concept of homogenous precipitation by taking an example. 2
- (d) Name the precipitating agent used in the homogenous precipitation of barium. 1