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III B.Sc Chemistry, Paper VI (Inorganic, Organic and Physical Chemistry)
5th Semester – Paper V - Model Paper

Time: 3 hours

Maximum marks: 75

Section A - (5 X 5 = 25marks)

Answer any FIVE questions.

1. What is EAN? Calculate the EAN of Fe^{+2} in $[\text{Fe}(\text{CN})_6]^{-4}$
2. Discuss the Gabriel's method for the preparation of amines.
3. Calculate the magnetic moment and mention the magnetic behaviour of $[\text{Ti}(\text{H}_2\text{O})_6]^{+4}$
4. Explain about Liebermann's nitroso reaction.
5. Explain the structure of $[\text{Co}(\text{NH}_3)_6]^{+3}$ on the basis of VBT.
6. State and explain the First law of thermodynamics.
7. Explain about Hofmann-Bromamide reaction.
8. Calculate the work done by 2 moles of an ideal gas in the isothermal reversible expansion from 5lit to 10lit at 27°C .

Section B – Essay Questions (5 X 10 = 50 marks)

Answer ALL questions.

9. (a) (i) Write the postulates of CFT.
(ii) Explain the crystal splitting in octahedral complexes.
OR
(b) What is meant of stability of a metal complex? Explain the factors that influence the stability of metal complexes.
10. (a) Explain the geometrical isomerism in complexes with coordination number six. OR
(b) Explain the (i) Job's method and (ii) mole ratio method for the determination of composition of a Complex.
11. (a) Explain about (i) Mannich reaction and (ii) Michael addition reaction. OR
(b) Discuss the basic character of aliphatic and aromatic amines.
12. (a) Explain about Carnot's cycle with diagram. OR
(b) Explain the Hinsberg method for the separation of mixture of Amines.
13. (a) (i) Write any two methods for the preparation of Nitrohydrocarbons.
(ii) Write short notes on tautomerism in nitroalkanes. OR
(b) Explain about (i) Diazotisation and (ii) Carbylamine reactions.

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Section A- (5 X 5 = 25marks)

Answer any FIVE questions.

1. Explain the role of iron and zinc in biological systems.
2. Define order and molecularity of a reaction.
3. Write a short notes on (i) Fluorescence and (ii) Phosphorescence
4. State and explain Paul-Knorr synthesis of (i) Furan and (ii) Pyrrole.
5. How do you convert Glucose into Fructose ?
6. Write a note on classification of amino acids.
7. What are Labile and Intert complexes? Give examples.
8. Explain Kiliani-Fischer synthesis.

Section B – Essay Questions (5 X 10 = 50 marks)

Answer ALL questions.

9. (a) Explain the structure and functions of Haemoglobin.
OR
(b) Explain the mechanism of SN^1 and SN^2 reactions in square planar complexes.
10. (a) (i) Derive First order rate equation.
(ii) Show that in a First order reaction time required for completion of 99.9% is ten times of half life ($t_{1/2}$) of the reaction.
OR
(b) (i) Explain Stark-Einstein's law of photochemical equivalence.
(ii) Explain the reasons for high quantum yield of photochemical reaction between H_2 and Cl_2
11. (a) Compare the aromatic character of Furan, Pyrrole and Thiophene
OR
(b) (i) Write any two nucleophilic substitution reactions in pyridine.
(ii) Explain about mutarotation.
12. (a) Discuss the open chain structure of Glucose.
OR
(b) (i) What are epimers? Write the mechanism of epimerisation.
(ii) Explain about osazone formation in glucose.
13. (a) (i) Write a note on Zwitter ion and isoelectric point.
(ii) Write any two methods of preparation of alpha amino acids.
OR
(b) (i) Explain Grothus-Draper's law.
(ii) What are Zero order reactions? Give two examples.

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