DCCH501

Reg. No. | | | | | | | | |

V Semester B.Sc. Degree Examination, February/March - 2024

CHEMISTRY

Inorganic Chemistry and Organic Chemistry - III

(CBCS NEP Scheme 2023-24 Onwards)

Paper : V

Time : 2½ Hours **Maximum Marks : 60**

Instructions to Candidates:

1. Question paper consists of **three** parts.
2. Answer **all** the parts.
3. Write chemical equations and **diagrams** wherever necessary.

PART - A

Answer any **FIVE** of the following questions. Each question carries 2 marks. **(5×2=10)**

1. Write IUPAC names of the following.

i) $[Ni(CO)_4]$

ii) $[Cu(NH_3)_4]SO_4$.

2. Define hapticity of a ligand. Give an example for bihapto ligand.

3. What are isotopes? Mention the radioactive isotope of hydrogen.

4. Explain nitriding of steel.

5. What is the action of heat on

i) Succinic acid.

ii) Adipic acid.

6. How is butanone prepared from acetoacetic ester?

7. Explain diazotisation with an example.

PART - B

Answer any FOUR of the following questions. Each question carries 5 marks.(4×5=20)

8. a) Write the postulates of Werner's theory of complexes.
   b) Explain Ionisation isomerism with an example. (3+2)
9. a) Give any three applications of radioisotopes.
   b) What is the role of control rods in nuclear reactors? Give example. (3+2)
10. a) Explain different types of carburizing of steel.
   b) Give the composition of
      i) Brass
      ii) Bronze. (3+2)
11. a) Write the mechanism of Acetal formation.
   b) How does acetone react with hydrazine? (3+2)
12. a) Explain AAC^2 mechanism of ester hydrolysis.
   b) How does tartaric acid react with hydrogen iodide? (3+2)
13. a) Discuss the mechanism of Wagner - Meerwein rearrangement.
   b) Mention the reagent used in Baeyer - Villiger oxidation reaction. (4+1)

PART - C

Answer any **THREE** of the following questions. Each question carries **10** marks.**(3×10=30)**

14. a) Discuss the splitting of d-orbitals in octahedral complexes.
   b) What are low spin and high spin complexes? Explain with an example.
   c) Give an example for hexadentate ligand. Write its structure. (4+4+2)
15. a) Give the applications of
      i) Cis - platin
      ii). $Na_2CaEDTA$.
   b) What is meant by half life of a radio active element? Derive an expression for half life. Period of radioactive element.
   c) Calculate the number of α and β particles emitted during the decay of $^{238}_{92}U$ to $^{206}_{82}Pb$.(4+4+2)
16. a) Explain the following with respect to heat treatment of steel;
      i) Hardening
      ii) Tempering.
   b) Explain the mechanism of Benzoin condensation.
   c) How does acetaldehyde react with $LiAlH_4$?
   (4+4+2)

17. a) Explain the following :

i) Reaction of acetyl chloride with dialkyl cuprate.

ii) Reaction of tartaric acid with HI.

b) How are the following compounds prepared from ethyl acetoacetate?

i) Butanoic acid

ii) Cinnamic acid.

c) Explain Keto - Enol tautomerism with an example. (4+4+2)

18. a) How do you convert Benzene diazonium chloride to

i) Phenyl hydrazine.

ii) P - hydroxy azobenzene.

b) Explain the alkylation reaction of primary amines with an example.

c) How ethanamine is prepared from Gabriel phthalamide synthesis? (4+4+2)