

Third Year B.Sc., Degree Examinations**September / October 2015***(Directorate of Distance Education)***CHEMISTRY****PAPER: DSC 261: CHEMISTRY – IV***Time: 3hrs.]**[Max. Marks: 75/85***Instructions to the candidates:**

- i) This paper consists of FIVE sections. Answer all sections.*
- ii) Write equations and neat diagrams where ever necessary.*
- iii) Section – E is compulsory for 85 marks scheme only.*

SECTION – A**I. Answer in a word, a phrase or a sentence:**

10 x 1 = 10 Marks

1. Which copper salt is colourless among CuCl and CuCl_2 ?
2. What are fluorocarbons?
3. Write the structure of dimethyl glyoxime.
4. State Grothuss – Drapper law.
5. Define dipole moment.
6. What is the selection rule for rotational quantum number J?
7. What is an unit cell?
8. What is a chiral carbon atom?
9. Give an example for active methylene compound.
10. What is chemotherapy?

SECTION – B**II. Answer any FIVE questions:**

5 x 3 = 15 Marks

11. Explain any three consequences of Lanthanide contraction.
12. Explain the preparation of Teflon from chloroform.

Contd..... 2

13. What is effective atomic number? calculate the effective atomic number of central metal ion in $K_3[Fe(CN)_6]$.
14. Explain optical isomerism in lactic acid.
15. Explain the preparation of terylene.
16. What are Miller indices? A crystal plane has intercepts on the three axes of crystal in the ratio of $3/2 : 2 : 1$. Calculate the Miller indices of the plane.
17. With mechanism explain the photo chemical decomposition of HI.

SECTION – C**III. Answer any FIVE of the following questions:**

5 x 6 = 30 Marks

18. a) Explain why the transitional metals form complex compounds?
b) What are freons? How is Freon 12 prepared from CCl_4 ? (3 + 3)
19. a) State and explain Lambert's – Beer's law.
b) Define Hook's law. (4 + 2)
20. a) Explain the synthesis of indigo from aniline.
b) How is dipole moment useful for the identification of Cis – trans isomers of 1,2 – difluoroethylene? (3 + 3)
21. a) Explain the resolution of racemic mixture by mechanical and biochemical methods.
b) How is glycine prepared from diethyl malonate? (4 + 2)
22. a) what are the postulates of Werner's theory of co-ordination compounds?
b) What are ligands? Give an example for neutral ligand. (4 + 2)
23. a) Derive an expression for moment of inertia of a diatomic molecule as rigid rotator.
b) State Einstein's law of photochemical equivalence. (4 + 2)
24. a) Explain the mechanism of drug action by
i) Metabolite antagonism
ii) Drug acting on cell wall
b) How is pyridine prepared from pyrrole? (4 + 2)

SECTION – D**IV. Answer any TWO of the following questions:**

2 x 10 = 20 Marks

25. a) Explain the separation of lanthanides by ion exchange chromatography.

Contd..... 3

- b) The bond length of HCl molecule is 1.28\AA . calculate the moment of inertia and frequency of first line in rotational spectra.
- c) Write a short note on green house effect. (4 + 4 + 2)
26. a) Discuss the electronic configuration and magnetic property of transition metals.
b) Explain geometrical isomerism in coordination compounds with coordination number four.
c) Mention any two uses of spectrophotometer. (4 + 2 + 4)
27. a) Derive Brag's equation $2d \sin\theta = n\lambda$.
b) Explain the following terms with example.
i) Fluorescence
ii) Phosphorescence.
c) CO_2 molecule has zero dipole moment correlate with its structure. (4 + 4 + 2)

SECTION – E

V. *Answer any ONE of the following questions:* 1 x 10 = 10 Marks
(Compulsory question for 85 marks scheme only)

28. a) Explain the synthesis of pyrrole and thiophene from acetylene.
b) Explain the mechanism of cationic polymerisation.
c) How is malachite green synthesized? (4 + 3 + 3)
29. a) On the basis of valence bond theory explain the formation of $[\text{Fe}(\text{CN})_6]^{4-}$.
b) Explain the formation of photochemical smog and mention any one effect of photochemical smog.
c) Mention any two advantages of organic reagents in inorganic quantitative analysis. (4 + 4 + 2)

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