

Third Year B.Sc. Degree Examination
Aug/Sept 2009
Directorate of Distance Education Course

PAPER - IV : CHEMISTRY

Time : 3 Hours

Max. Marks : 75

- Note :**
- 1) This paper consists of Four sections. Answer all sections.
 - 2) Write equations & neat diagrams wherever necessary.

SECTION - A

- I. Answer the following questions in a word, a phrase or a sentence. 10x1=10**
1. Transition elements show variable oxidation states. Why?
 2. What are ambidentate ligands?
 3. Write the IUPAC name of $K_4 [Fe(CN)_6]$.
 4. What is Hooke's law?
 5. What is the shape of water molecule?
 6. Write the structural formula of chloroquin.
 7. Define chemiluminescence.
 8. What are Enantiomers?
 9. What is addition polymerisation?
 10. What is photochemical smog?

SECTION - B

- II. Answer any FIVE questions. 5x3=15**
11. Explain the mechanism of Anionic polymerisation.
 12. Write the synthesis of Methyl orange.
 13. Write the structure of oxine. Mention any two uses of EDTA in inorganic quantitative analysis.
 14. What is Effective atomic number? Calculate EAN of Iron in potassium ferrocyanide.
 15. Discuss Beer's law.
 16. Define a) plane of symmetry b) Space lattice c) Law of constancy of angles.
 17. What are selection rules for rotational and vibrational spectra? State selection rule.

SECTION - C**III. Answer any FIVE questions.****5x6=30**

18. a) What is Green house effect? Mention the consequences of Green house effect on the atmosphere. 4
 b) What is linkage isomerism? Give an example. 2
19. a) Discuss lanthanide contraction giving causes and its consequences. 4
 b) Out of iron and zinc salts, which is attracted in a magnetic field. Explain with reason. 2
20. a) What is chirality centre? Explain the optical isomerism of lactic acid. 4
 b) Write any one method of synthesis of pyridine. 2
21. a) What are the conditions for Geometrical isomerism? How do you assign E & Z notation to the geometrical isomers? 4
 b) What is chemotherapy? Mention the use of Antipyrine. 2
22. a) Discuss the photosynthesis of HBr from hydrogen and bromine. 4
 b) State and explain Grotthus law. 2
23. a) Derive an expression for the rotational energy of a diatomic molecule taking it as a rigid rotator. 4
 b) How is dipole moment useful for the determination of the shape of CO₂ molecule? 2
24. a) What type of potential energy curve is obtained for a simple harmonic oscillator and why? 4
 b) Hydrogen molecule does not give rotational spectrum where as hydrogen chloride molecule gives rotational spectrum. Why? 2

SECTION - D**IV. Answer any TWO of the following.****2x10=20**

25. a) On the basis of valence bond theory, explain hybridisation, structure and magnetic properties of [Ni (CO)₄] and [Cu (NH₃)₄]²⁺. 5
 b) What is a Dye? Discuss the colour and constitution of a dye on the basis of modern theory. 5
26. a) What are active methylene compounds? Mention any four synthetic applications of Ethyl acetoacetate. 5
 b) Define Bragg's law. Derive Bragg's equation for the diffraction of X-rays by crystal lattice. 5
27. a) What is meant by dosimeter? Explain ceric sulphate dosimeter. 3
 b) Explain the term phosphorescence with an example. 2
 c) Define stability constant of a complex compound. Discuss the factors affecting the stability of complex compounds. 5