DSC – 270 (CHEM-UG)

Final Year B.Sc. Degree Examination, November 2008
Directorate of Distance Education Course
CHEMISTRY (Paper – IV)

Time : 3 Hours Max. Marks : 75

Notes : *1) This paper consists of **four** Sections. Answer **all** Sections.*
*2) Write equations and neat diagrams wherever **necessary**.*

SECTION – A

I. Answer the following questions in **a word, a phrase** or **a sentence** : **(10×1=10)**

1) What are transition elements ?
2) State Einstein's law of photochemical equivalence.
3) What are chromophores ?
4) Define BOD of water.
5) What is dipole moment ?
6) Write the structural formula of Antipyrine.
7) Define unit cell.
8) Define ionisation isomerism.
9) What is the selection rule for rotational transitions ?
10) What is condensation polymerization ?

SECTION – B

II. Answer **any FIVE** questions : **(5×3=15)**

11) How is Teflon prepared ? Mention any two uses of it.
12) What is dosimeter ? Explain the Frick-Dosimeter.
13) Give the synthesis of Malachite green.

P.T.O.

14) Explain the mechanism of Free radical polymerization.

15) Write the structures of EDTA and DMG. Mention any two advantages of EDTA in inorganic quantitative analysis.

16) Derive an expression for the moment of inertia of hetero nuclear diatomic molecule behaving as a rigid rotator.

17) Give the synthesis of sulphothiozole.

SECTION – C

III. Answer **any FIVE** questions : **(5×6=30)**

18) a) Discuss the chemistry of transition elements with respect to (i) variable oxidation state (ii) magnetic property. **4**

b) What are the main pollutant of soil ? Suggest the methods to control the soil pollution. **2**

19) a) What are the postulates of Werner's theory of complexes ? **4**

b) What is an acid rain ? Mention harmful effects of acid rain. **2**

20) a) Explain the ion exchange method of separation of lanthanides. **4**

b) Explain the term fluorescence with example. **2**

21) a) Define quantum yield. In a photochemical decomposition of HI, the quantum yield is nearly 2. Show how it can be justified. **4**

b) Explain why CO_2 molecule has zero dipole moment while SO_2 has a dipole moment of 1.64 D. **2**

22) a) Discuss Beer's Law. What are the applications of Beer's law ? **4**

b) Define orientation polarization and molar refraction. **2**

23) a) Discuss the optical isomerism of tartaric acid. **4**

b) Describe any one method of preparation of Thiophene. **2**

24) a) How do you assign R and S notation to the optical isomers ? **4**

b) What are heterocyclic compounds ? Give IUPAC name for pyridine. **2**

SECTION – D

IV. Answer **any TWO** of the following : **(2×10=20)**

25) a) Discuss the causes and consequences of Lanthanide contraction. **5**

b) Discuss the vibrational spectra of a diatomic molecule with particular reference to

i) region of occurrence

ii) criteria of absorbance

iii) selection rule

iv) expression for the vibrational energy

v) zero point energy. **5**

26) a) What is Bragg's law ? Derive Bragg's equation for the diffraction of X-rays by crystal lattice. **5**

b) What is meant by resolution of recemic mixture ? Describe any two methods of resolution of racemic mixtures. **5**

27) a) How is ethyl aceto acetate prepared ? Discuss the mechanism of the reaction. **5**

b) Discuss the formation of $[Fe(CN)_6]^{3-}$ and $[Fe(CN)_6]^{4-}$ complex ions on the basis of valency bond theory. Mention magnetic properties. **5**