Final Year B.Sc., Degree Examination

Aug / Sept 2011

Directorate of Correspondence Course

Chemistry

Paper - IV

Time : 3 hrs *Max. Marks : 75/85*

1. *This paper consists of **FIVE** sections. Answer all sections.*
2. *Write equations and neat diagrams wherever necessary.*
3. *Section - '**E**' is compulsory for 85 marks scheme.*

SECTION - A

Answer the following questions in a word, a phrase or in a sentence. 1 x 10 = 10

1. Define effective atomic number.
2. State law of constancy of angle.
3. What is racemisation?
4. Write the structure of DMG.
5. What are dyes?
6. Define orientation polarization.
7. What is meant by water pollution?
8. Mention the monomers used in the preparation of Nylon -- 6, 6 polymer.
9. State Grothus -- Draper law.
10. Define fluorescence.

SECTION - B

Answer any FIVE of the following: 5 x 3 = 15

11. Discuss the sources for acid rain.
12. Explain the optical isomerism of lactic acid.
13. Explain any two methods for the detection of complex formation.
14. Outline the synthesis of butanoic acid from ethylacetoacetate.
15. Explain the magnetic properties of transition elements.
16. Decomposition of HCl has high quantum yield – Justify.
17. How are cis and trans isomers of 1, 2 – dichloroethene identified by dipole moment?

Contd....2

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SECTION - C

Answer any FIVE of the following: 5 x 6 = 30

18. a) Derive an equation for moment of inertia of a diatomic molecule as rigid rotator.

b) What are Miller indices? 4 + 2

19. a) Explain Walden inversion with mechanism.

b) Give the structure of malachite green. 4 + 2

20. a) Give the postulates of Werner's theory of coordination compounds.

b) How is Teflon prepared? 4 + 2

21. a) Explain the working of Ceric sulphate dosimeter.

b) What are electromagnetic radiations? 4 + 2

22. a) Explain chromophore – auxochrome theory of dyes.

b) What are the conditions for a compound to exhibit geometrical isomerism? 4 + 2

23. a) Define (a) Plane of symmetry (b) Space lattice (c) Unit cell

b) What are singlet and triplet states of molecules? 4 + 2

24. a) Explain the causes and consequences of lanthanide contraction.

b) Give the IUPAC name of $[Cu(NH_3)_4]\ Cl_2$ 4 + 2

SECTION - D

Answer any TWO of the following: 2 x 10 = 20

25. a) Discuss the mechanism of cationic polymerization with a suitable example.

b) Give the synthesis of pyrrole and pyridine.

c) Explain any one method of synthesis of antipyrine. 4 + 4 + 2

26. a) Explain the separation of lanthanides by ion exchange method.

b) Discuss the factors affecting the stability of complexes.

c) What are the inner and outer orbital complexes? 4 + 4 + 2

27. a) Derive Braggs equation.

b) The pure rotational spectrum of gaseous HCl consists of a series of spectral lines equally spaced by 20.80 cm^{-1}. Calculate the inter nuclear distance. (The atomic mass of H = 1.673 x 10^{-27} kg and Cl = 58.06 x 10^{-27}kg).

c) Give the mathematical expressions for Hook's law and force constant of a bond. 4 + 4 + 2

Contd.....3

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SECTION - E

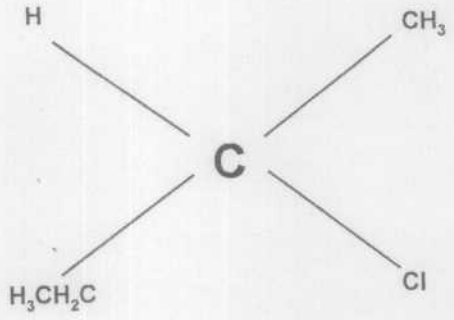
Answer any ONE of the following: 1 x 10 = 10

28. a) What are the advantages of organic reagents in inorganic quantitative analysis?

b) Discuss the constitution of alizarine. 5 + 5

29. a) (i) Discuss the mechanism involved in claisen condensation

(ii) Assign the 'S' configuration for



4 + 1

b) Explain the hybridization, structure and magnetic properties of the following on the basis of valence bond theory.

(i) $[Fe(CN)_6]^{-3}$ (ii) $[Ni(CN)_4]^{-2}$ 5

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