

**Third Year B.Sc., Degree Examinations,
December 2017**

(Directorate of Distance Education)

CHEMISTRY

Paper: DSC – 261: CHEMISTRY – IV

Time: 3 hrs]

[Max. Marks: 75/85

Instruction to the Candidates:

1. This question paper consists of FIVE sections. Answer all the sections.
2. Write equations and neat diagrams wherever necessary.
3. Section – E is compulsory question for 85 marks scheme only
4. Section – A contains one mark questions and should be answered in first two pages of the main answer book. The questions Section – A answered in any other part will not be valued.

SECTION – A

I. Answer the following in a word, a phrase or a sentence: 10 x 1 = 10 Marks

1. What are paramagnetic substances?
2. Define quantum efficiency.
3. What are enantiomers?
4. Write the electronic configuration of Gadolinium (At. No. 64).
5. Define specific rotation.
6. What is absorption spectrum?
7. Define active methylene compounds.
8. What are silicones?
9. What is a thermoplastic?
10. What is meant by space lattice?

SECTION – B

II. Answer any FIVE of the following questions: 5 x 3 = 15 Marks

11. Explain the conformational analysis of 1, 2 dichloro ethane.
12. Write the synthesis of alizarin.
13. Explain the structure of $(NPCl_2)_3$ molecule.
14. Write the effluents which cause water pollution.
15. Explain the photochemical decomposition of HBr .
16. Explain the mole ratio method for the determination of composition of complex.
17. Write a note on Lanthanide contraction.

Contd.....2

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

5 x 6 = 30 Marks

18. a) Explain the properties of d – block elements.
 i) Variable valency ii) Formation of coloured complexes.
 b) Write the effect of soil acidity on plants. (4 + 2)
19. a) Write a note on spectrophotometric titrations.
 b) How the structure of water molecule determined by dipole moment? (4 + 2)
20. a) Write the Skruap synthesis of quinoline.
 b) Write a note on Vulcanization of rubber. (4 + 2)
21. a) Write the assumptions of valence bond theory.
 b) Explain (i) Blue shift (ii) Hyper chromic Shift. (4 + 2)
22. a) Compare the aromaticity of pyrrole, furan and thiophene.
 b) Write the mechanism of free radical polymerisation. (2 + 4)
23. a) Derive the expression for rotational energy of diatomic molecule.
 b) Explain the geometrical isomerism in Ma_4b_2 type of complexes. (4 + 2)
24. a) Write the general properties of inorganic polymers.
 b) The bond length of H – I bond is 1.60 \AA and its dipole moment is 0.38D. Calculate the percentage ionic character of H – I bond. (3 + 3)

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

2 x 10 = 20 Marks

25. a) Write the salient features of Werner's theory.
 b) Write the synthesis of ethyl aceto acetate by Claisen condensation method.
 c) Determine the interplanar spacing between the 2, 2, 1 planes of cubic lattice of length 4.5 \AA . (4 + 3 + 3)
26. a) Derive Bragg's law.
 b) Derive Beer's law.
 c) What are co-ordination compounds? How do they differ from double salts? (4 + 3 + 3)
27. a) What are Lanthanides? Describe the ion-exchange method for the separation of Lanthanides.
 b) Write the synthesis of Sulphanilamide.
 c) Explain the condensation polymerization by taking terylene as an example. (4 + 3 + 3)

Contd.....3

SECTION – E

V. Answer any ONE of the following questions:

1 x 10 = 10 Marks

(Compulsory question for 85 marks scheme only)

28. a) What are the reasons for very high and very low quantum yield?
b) Write the synthesis of Neoprene.
c) Write the synthesis of antipyrine.
d) (i) Define Zero point energy (ii) Write the selection rule for vibrational spectra.
(2 + 3 + 3 + 2)
29. a) The pure rotational spectrum of HCl molecule contains a series of equally spaced line separated by 20.80 cm^{-1} . Calculate the inter nuclear distance of the molecule. The atomic masses of H and Cl are $1.673 \times 10^{-27} \text{ Kg}$ and $58.06 \times 10^{-27} \text{ Kg}$.
b) Write the synthesis of methyl orange.
c) Explain the different types of elements of symmetry in a cubic crystal. (4 + 3 + 3)

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