



DSC – 261

Final Year B.Sc. Degree Examination, September/October 2012  
(Directorate of Distance Education)  
CHEMISTRY (Paper – IV)

Time : 3 Hours

Max. Marks : 75/85

- Instructions:** 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

(10×1=10)

Answer the following questions in a **word**, a **phrase** or in a **sentence** :

1. Define Hook's law.
2. Mention the unit of dipole moment.
3. Define drug.
4. Write the structure of antipyrine.
5. Mention the IUPAC name of  $[\text{Pt Cl}_4 (\text{NH}_3)_2]$
6. State law of constancy of elements of symmetry.
7. What are transition elements ?
8. Which of the following molecule show rotational spectra,  $\text{BF}_3$ ,  $\text{CO}_2$ ,  $\text{HF}$ .
9. Write the structure of Nickel dimethyl glyoximate.
10. What is an active methylene group ?

SECTION – B

(5×3=15)

Answer **any FIVE** of the following :

11. How is Teflon prepared ? Mention its uses.
12. Discuss the mechanism of formation of photochemical smog.
13. Derive the equation  $2d \sin \theta = n\lambda$  .

P.T.O.



14. What are chromophores and auxochromes ? Give one example for each.
15. Explain the optical isomerism of tartaric acid.
16. How is sulphathiazole synthesized ?
17. Discuss the photochemical formation of HCl.

## SECTION – C

(5×6=30)

Answer **any FIVE** of the following :

18. a) Derive an expression for moment of inertia of hetero nuclear diatomic molecule as rigid rotator. **4**  
b) What are isotropy and anisotropy ? **2**
19. a) The microwave spectrum of HF molecule consists of series of equidistance lines with spacing  $12.4 \text{ cm}^{-1}$ . Calculate the bond length of the molecule.  
b) What are Miller indices ? A crystal plane has intercepts on the three axes of crystal in the ratio  $3/2 : 2 : 1$ , what are the miller indices of the plane ? **(3+3)**
20. a) Discuss the free radical mechanism of addition polymerisation. **4**  
b) How is pyrrole synthesised from acetylene ? **2**
21. a) Compare the basicities of pyrrole and pyridine. Justify your answer. **3**  
b) Give the synthesis of succinic acid from ethyl acetoacetate. **3**
22. a) Explain the use of oxine in gravimetric estimation of magnesium. **3**  
b) What is Green House effect ? Give its consequences. **3**
23. a) Describe the structure and magnetic properties of  $[\text{Fe}(\text{CN})_6]^{3-}$  on the basis of VBT. **3**  
b) What are the postulates of Werner's theory ? **3**
24. a) Explain Walden inversion with an example. **3**  
b) Explain the following terms :
  - i) Chemiluminescence
  - ii) Photo synthesis. **3**



## SECTION – D

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

25. a) Explain the construction and working of spectrophotometer.  
b) Discuss the mechanism of radiolysis of water.  
c) Define the following terms :  
    i) Induced polarization                      ii) Orientation polarization (3+4+3)
26. a) Elucidate the structure of alizarin.  
b) Write the synthesis of malachite green.  
c) What are condensation polymers ? Give an example. (4+4+2)
27. a) Explain the following properties of lanthanide elements.  
    i) Oxidation states  
    ii) Magnetic properties.  
b) Why the compounds of transition elements are coloured ?  
c) Explain the following with examples :  
    i) Ionization isomerism                      ii) Hydrate isomerism (4+2+4)

## SECTION – E

(1×10=10)

Answer **any ONE** of the following :

28. a) i) What are dyes ? How are they classified based on chemical structure ?  
    ii) What are outer and inner orbital complexes ? (3+2)  
b) i) Discuss the consequences of lanthanide contraction.  
    ii) Explain any two factors influencing the stability of complexes. (2+3)
29. a) Explain the following elements of symmetry.  
    i) plane of symmetry  
    ii) axes of symmetry  
    iii) centre of symmetry.  
b) Sketch the vibrational energy levels of a molecule considering as a simple harmonic oscillator. What is zero point energy ?  
c) Explain laws of photo chemistry. (3+3+4)