US – 336

II Semester B.Sc. Examination, May 2017
(CBCS) (2014-15 and Onwards) (F + R)
CHEMISTRY – II

Time : 3 Hours

Max. Marks : 70

Instructions : *1) The question paper has **two** Parts.*
*2) Answer **both** Parts.*
*3) Write equations **wherever** necessary.*

PART – A

Answer **any eight** of the following questions. **(8×2=16)**

1. Define lattice energy.
2. What are polar molecules ? Give an example.
3. Explain intra molecular hydrogen bonding with an example.
4. Explain wave particle duality.
5. State Heisenberg's uncertainity principle. Write its mathematical form.
6. Write the possible values of l and m, when n = 3.
7. Calculate the magnetic moment of Cr^{3+} ion. (At no. of Chromium is 24).
8. Explain Huckel's rule of aromaticity with an example.
9. Write the cis and trans isomers of stilbene.
10. How is the conversion of toluene into benzaldehyde effected ? Give the equation.
11. State Saytzeff rule. Give an example.
12. Name the inert gas used in
    I) Nuclear reactors.
    II) Radio therapy.

P.T.O.

PART – B

Answer **any nine** of the following questions. (9×6=54)

13. a) Explain the significance of quantum numbers.
    b) Define the terms Eigen values and Eigen functions. (4+2)

14. a) Derive an expression for the radius of n^{th} orbit of hydrogen atom.
    b) Calculate the wave length of a moving ball of mass 0.2 kg travelling with a velocity of 150 m/s, $h = 6.625 \times 10^{-34}$ JS^{-1}. (4+2)

15. a) Explain the terms (i) Hamiltonian operator (ii) Laplacean operator.
    b) Write Schrodinger wave equation and indicate the terms involved. (4+2)

16. a) Set up Born-Haber's cycle for the formation of Sodium Chloride crystal and compute the calculation for lattice energy of the crystal.
    b) Account for the electrical property of semi conductors based on band theory. (4+2)

17. a) Discuss the structure of ammonia molecule based on VSEPR theory.
    b) Give the consequence of hydrogen bonding in (i) DNA (ii) Protein. (4+2)

18. a) Explain sp^3 hybrization taking $SiCl_4$ as an example.
    b) Define dipole moment. Write its SI unit. (4+2)

19. a) What are silicates ? How are they classified based on structure ?
    b) What are interstitial compounds ? (4+2)

20. a) Give any four differences between d and f block elements.
    b) Mention any two consequences of lanthanide contraction. (4+2)

21. a) Describe the separation of lanthanides by ion exchange method.
    b) What are transuranic elements ? Give two examples. (4+2)

22. a) How is XeF_6 prepared ? Explain its structure.
    b) Explain Birch reduction reaction. (4+2)

23. a) Explain the mechanism of nitration of benzene.
    b) How is the conversion of naphthalene into phthalic acid effected ? Give equation. (4+2)

24. a) Explain the orienting influence of $-CH_3$ group in toluene towards electrophilic substitution.
    b) How is biphenyl prepared from Ullmann reaction ? (4+2)

25. a) Explain the mechanism of SN^2 reaction with a suitable example.
    b) Between vinylchloride and allylchloride which is more reactive and why ? (4+2)