B.Sc DEGREE (CBCS)EXAMINATION, MARCH 2021

Third Semester

Complementary Course - CH3CMT03 - CHEMISTRY- PHYSICAL CHEMISTRY-I

Common to B.Sc Geology and Water Management Model III, B.Sc Geology Model I, B.Sc Physics Model I

2017 Admission Onwards

37978A60

Time: 3 Hours   Max. Marks : 60

Part A

*Answer any **ten** questions.*

*Each question carries **1** mark.*

1. Define lattice energy.

2. What are crystal systems? How many are observed?

3. Sketch the (220) planes of a face-centred cubic lattice.

4. Give Bragg's equation.

5. Define liquid state.

6. Define surface tension of a liquid.

7. Give any two application of Henry's Law.

8. Explain the term average velocity of a gas.

9. Give the relationship that connects the RMS velocity of a gas with temperature.

10. What is meant by chemisorption?

11. Differentiate Lyophilic and lyophobic colloids.

12. What are the phases which coexist in equilibrium at the triple point of water?

(10×1=10)

Part B

*Answer any **six** questions.*

*Each question carries **5** marks.*

13. Give a brief account of classification of magnetic materials.

14. Explain the meanings of centre of inversion and inversion operation. Name three examples for molecules which posses a centre of inversion.

15. Explain the terms proper rotation axis, mirror plane and inversion centre with regard to crystals.

16. Discuss the thermographic behaviour of solids.

17. 1.250 g of naphthalene was dissolved in 60 cm3 of benzene and freezing point of the solution was found to be 277.515 K, while that of benzene 278.495 K. Calculate the molecular mass of naphthalene. (Given, density of benzene 0.880 g cm–3 Kf = 5.1 K per 1000 g of benzene).

18. At what temperature will the RMS velocity of chlorine gas be equal to that of sulphur dioxide at 273 K?

19. Discuss Maxwell distribution of molecular velocities.

20. What is electrophoresis? How does this phenomenon provide information about the sign of charge on particles.

21. Compare the quantities extracted from 100 mL of aqueious solution by (a) 100 mL of ether in a single operation and (b) two successive operations of 50 mL ether in each.

(6×5=30)

Part C

*Answer any **two** questions.*

*Each question carries **10** marks.*

22. Differentiate between conductors and insulators with the help of band theory of solids.

23. Discuss different theories of liquid state.

24. (a) Discuss the origin of charge on colloids.
    (b) What is meant by electrical double layer?
    (c) What is meant by Zeta potential?

25. Give the thermodynamic derivation of Nernst distribution law.

(2×10=20)