

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI-86

(For candidates admitted during the academic year 2011–12)

SUBJECT CODE: 11CH/MC/PC54

B.Sc. DEGREE EXAMINATION, NOVEMBER 2013

BRANCH IV- CHEMISTRY

FIFTH SEMESTER

REG.NO

COURSE : MAJOR CORE

PAPER : PHYSICAL CHEMISTRY-II

TIME : 30 MINUTES

MAX.MARKS : 30

SECTION – A

(30x1=30)

ANSWER ON THE QUESTION PAPER ITSELF.

Answer all the questions.

I. Choose the Correct Answer:

- Cesium Chloride belongs to
a) Simple Cubic b) BCC c) FCC d) monoclinic
- The coordination number in HCP arrangement is
a) 6 b) 8 c) 4 d) 12
- The number of phases existing at the triple point of water is
a) 1 b) 2 c) 3 d) 0
- The addition of a solute _____ the freezing point of the solvent
a) Decreases b) Increases c) does not affect d) none of the above
- Alloys can be termed as
a) Liquid crystals b) Solid solutions c) Anisotropic solids d) Amorphous solids
- Which one of the following is not a colligative property
a) Osmotic pressure b) Depression in freezing point
c) Elevation in boiling point d) Mole fraction
- A system with lower CST is
a) Phenol- Water b) Triethylamine- Water c) Nicotine- Water d) Phenol-NaCl
- Solubility of a gas in liquid is affected by
a) Solvent b) Pressure c) Nature of the gas d) All the above
- An example for minimum boiling point azeotrope is
a) Water-ethanol b) Water-HCl c) Benzene-Water d) Benzene-Toluene
- System with Congruent melting point is
a) Zn-Mg b) Ag-Pb c) Ag-Au d) $\text{CuSO}_4\text{-H}_2\text{O}$

II. Fill up the blanks:

- If the radius ratio r^+/r^- is 0.732 – 0.414, the geometry of the crystal is _____
- Liquid crystals with thread like structure is known as _____

13. The number of phases existing at eutectic point are _____
14. The number of atoms in a BCC unit cell is _____
15. The coordination number of Ca^{2+} in CaF_2 structure is _____
16. RBC and _____ % solution of NaCl are isotonic
17. Nicotine- water system shows _____ CST
18. The vapour pressure of a pure component is _____ than the vapour pressure of the same component in a mixture
19. The source used in a neutron diffraction studies is _____
20. A cube has _____ diagonal planes of symmetry

III. State whether True or False:

21. Carbon exhibits allotropy
22. Using Neutron diffraction studies isotopes cannot be distinguished
23. A void surrounded by six spheres is called a tetrahedral void
24. The maximum number of phases present in sulphur system is 4
25. Rast method is used to determine molecular mass of a solute

IV. Answer in a line or two:

26. What is meant by centre of symmetry?
27. The Weiss indices of a plane are $\frac{1}{2} \frac{1}{2} \frac{1}{2}$, What are the Miller Indices?
28. What are isotonic solutions?
29. State Henry's Law
30. What is the effect of adding NaCl to Phenol-water system?



STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI-86
(For candidates admitted during the academic year 2011–12)

SUBJECT CODE: 11CH/MC/PC54

B.Sc. DEGREE EXAMINATION, NOVEMBER 2013
BRANCH IV- CHEMISTRY
FIFTH SEMESTER

COURSE : MAJOR CORE
PAPER : PHYSICAL CHEMISTRY-II
TIME : 2½ HOURS

MAX.MARKS : 70

SECTION – B

(5x6=30)

Answer any FIVE questions:

1. What are the different kinds of liquid crystals?
2. Discuss the structure of ZnS and calculate the number of atoms in its unit cell.
3. Give the thermodynamic derivation of Gibb's phase rule
4. What is Vant Hoff factor? How is it related to degree of dissociation & degree of association?
5. Explain the principle of fractional distillation for Type-I binary solutions
6. In the process of extraction of solute from a solution the extracting liquid should not be used in one lot. Explain
7. Discuss the phase diagram of Ag-Pb system

SECTION-C

Answer any TWO questions:

(2X20 = 40)

8. a) Sketch the Miller planes (100) (010) and (111)
b) How can Bragg's equation be used to determine the structure of NaCl
c) Distinguish between isomorphism and polymorphism (6+8+6)
9. a) What are the essential features of a freezing mixture
b) Discuss the phase diagram of FeCl₃ – H₂O .
c) Calculate the number of degrees of freedom for the following
i) Ice water ii) saturated solution of NaCl-Pb
iii) CaCO₃ ↔ CaO+CO₂ iv) At Eutetic point (6+8+6)

10. a) Derive a relation between elevation of boiling point of the solution and molecular weight of the solute.
- b) The freezing point depression of a solution containing 0.5209g of non electrolyte in 80.2g of water is 0.067 K. Calculate the molar mass of the non electrolyte solute. (K_f for water = 1.86K)
- c) Discuss the significance of Reverse –Osmosis (8+4+8)
11. a) Distinguish between the structure of diamond and graphite.
- b) Explain the principle of steam distillation
- c) What are azeotropes? (8+7+5)

▲▲▲▲▲▲▲▲▲▲