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

SUBJECT CODE: 11CH/MC/PC54

B.Sc. DEGREE EXAMINATION, NOVEMBER 2015
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:

1. The coordination number of ccp is _____.
   (a) 12 (b) 6 (c) 18 (d) 8

2. The unit cell of metallic gold is fcc.The number of atoms that occupy the gold unit cell is _____.
   (a) 4 (b) 5 (c) 6 (d) 8

3. The covalent crystals are hard and have _____ melting points.
   (a) low (b) high (c) zero (d) same

4. The amorphous solid among the following is
   (a) Table salt (b) Diamond (c) Plastic (d) Graphite

5. In a crystal, the atoms are located at the positions where potential energy is ____.
   (a) maximum (b) minimum (c) zero (d) infinite

6. Sugars dissolve in water due to the formation of _____.
   (a) covalent bonds (b) ionic bonds (c) coordinate bonds (d) hydrogen bonds

7. The completely miscible solution can be separated by _____.
   (a) a separating funnel (b) evaporation (c) fractional distillation (d) none of these

8. In a saturated solution there exists an equilibrium between _____.
   (a) solvent and excess of solid (b) solution and excess of solid
   (c) solid and excess of solvent (d) solid and excess of solid

9. The liquid mixtures which distill with a change in composition are called ____ mixtures.
   (a) azeotropic (b) equilibrium (c) zeotropic (d) non-equilibrium

10. An alloy is a homogenous mixture of _____.
    (a) two solids (b) two liquids (c) two metals (d) two non-metals

II. Fill in the blanks:

11. The coordination number of a crystal structure is _____ adjacent to each particle in the lattice.
12. In ionic crystals the ions are held together by strong _____ attractions.
13. The number of phases present in the mixture of N_2, H_2 and O_2 is _____.
14. The liquid crystals have the fluidity of a liquid and _____ of a solid.
15. The temperature at which a polymorphic substance changes from one form to another is _____ point.
16. The eutectic temperature of KCl and ice is _____.
17. Normality of a solution is the number of _____ of solute per litre of the solution.
18. _____ g of glucose are present in 100 ml of 0.1M solution.
19. The organic liquids which decompose at the boiling point are purified by _____.
20. For one component system, at triple point the number of degree of freedom is _____.

III. Match the following:

21. H_2O	(a) Order of reflection
22. Triple point	(b) 1-component system
23. C_6H_5OH-H_2O	(c) non-variant system
24. NaCl	(d) CST
25. n	(e) Cubic system

IV. Answer in a line or two:

26. Define the term radius-ratio.

27. What is Bravais lattices?

28. What is deliquescence?

29. What are colligative properties?

30. What is CST?

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TIME : 2½ HOURS **MAX.MARKS : 70**

SECTION – B **(5x6=30)**

Answer any FIVE questions:

1. Explain the elements of symmetry.
2. Discuss the packing of ions in crystals
3. Write the applications of Neutron diffraction studies.
4. Discuss reverse osmosis.
5. (a) Find the degree of ionization for HF in 0.1 m aqueous solution, if the freezing point of the solution is $-0.19^{o}C$. (K_f for water = $1.86^{o}C$)
   (b) What are azetropes? Give an example.
6. Explain the phase diagram of simple eutectic system. Apply the phase rule and explain.
7. (a) State Henry's law.
   (b) What are Freezing mixtures? Give any two examples.

SECTION-C

Answer any TWO questions: **(2X20 = 40)**

8. (a) Differentiate between polymorphism and isomorphism. (5)
   (b) Explain Miller indices. (5)
   (c) Explain the term liquid crystals. Give its types, structures and application. (10)

9. (a) Derive the Bragg's equation. (6)
   (b) Discuss the various crystal systems. (7)
   (c) Explain the phase diagram of Mg-Zn system. (7)

10. (a) Construct the phase diagram of sulphur system and explain. (7)
    (b) Derive the Nernst distribution law. Give its applications. (7)
    (c) Explain (i) void space (ii) steam distillation (6)

11. (a) Derive thermodynamic relationship of depression in freezing point and colligative property. (7)
    (b) Explain Van't Hoff factor. (3)
    (c) Explain Raoult's law. Give its application. (4)
    (d) Explain the systems : (i) $HCl – H_2O$ (ii) Phenol – H_2O (6)