STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI-86
(For candidates admitted during the academic year 2008–09 & thereafter)
SUBJECT CODE: CH/MC/PC54
B.Sc. DEGREE EXAMINATION, NOVEMBER 2011
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. Total number of symmetry elements in a cubic crystal is
   a) 32 b) 13 c) 23 d) 9
2. An array of points showing how molecules, atoms or ions are arranged at different sites in three dimensional space is known as _____
   a) unit cell b) Miller indices c) Weiss indices d) Space lattice
3. The number of components in the system $Ice_{(s)} \rightarrow Water_{(l)} \rightarrow$ Water $vapour_{(g)}$
   a) 1 b) 4 c) 2 d) 3
4. Isotonic solutions have
   a) the same freezing point b) the same boiling point
   c) the same surface tension d) the same osmotic pressure
5. In cubic, tetragonal and rhombic systems of crystal structure ,the angle between the edges is _____
   a) 120^o b) 90^o c) 60^o d) 45^o
6. The colligative properties of a non-electrolyte solution depend on
   a) number of solute molecules b) nature of solute molecules
   c) both number and nature d) none of the above

II Fill in the blanks:

7. The fractional distillation of two liquids is done using _____ rule.
8. Diamond possesses _____ structure.
9. The mixture of acetone and solid carbon-dioxide is known as _____.
10. CsCl has _____ coordination.
11. Gibbs free energy change of mixing for an ideal solution is always _____ quantity.
12. Bragg' s equation is _____.

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III Say True or False :

13. Total number of Bravais lattice in a crystal is 14.
14. ZnS has 8:4 coordination.
15. Solution of salt at room temperature is a one component system.
16. Reverse osmosis is used in desalination of sea water.
17. The mixture of benzene and toluene behaves like a non ideal solution.
18. The miscibility of two liquids increases or decreases with temperature depending upon the components.

IV Match the following:

19. Plane of symmetry	-	HCl - H_2O
20. Azeotrope	-	Triethylamine -water
21. Efflorescence	-	Ni-Cu
22. CST	-	Calcium chloride
23. Deliquescence	-	BF_3
24. Solid solution	-	$MgSO_4.7H_2O$

V Answer in one or two sentences:

25. What is peritectic change?

26. What is meant by polymorphism?

27. What are Miller indices?

28. What is Henry' s law.

29. What is Raoult's law?

30. Give the lever rule.

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TIME : 2½ HOURS **MAX.MARKS : 70**

SECTION – B (5x6=30)

Answer any five questions:

1. Draw and explain the $CuSO_4$-H_2O system.
2. Draw and describe the structure of graphite.
3. Draw and discuss the phase diagram of Zinc- Magnesium system.
4. What is CST? Discuss the variation of mutual solubility of Nicotine -water system.
5. What is radius ratio? How can it predict the structure of ionic compounds?
6. Describe the basic theory of neutron diffraction studies. How does it differ from X- ray diffraction studies? Give its applications.
7. Write notes on azeotropes.

SECTION-C

Answer any two questions: (2X20 = 40)

8. (a) Draw schematically the phase diagram of $FeCl_3$-H_2O system and apply Gibb's phase rule to explain. (10)
   (b) Draw and explain the phase diagram of Sulphur system. (10)

9. (a) What are liquid crystals? Mention their characteristics. Explain their classification and applications. (10)
   (b) Draw the structure of CaF_2 and show coordination around each type of ion in this structure. (10)

10. (a) Discuss the cubic and hexagonal close packing of arrangement of ions in crystals (10)
    (b) Discuss the elements of symmetry and symmetry operations in molecules. (10)

11. (a) State Nernst distribution law. Derive the thermodynamic derivation of the law. (10)
    (b) What is Van't Hoff factor? Explain how the degree of dissociation of a non- electrolyte may be determined from the measurement of colligative properties. (5)
    (c) Explain the principle underlying the process of steam distillation. What are its applications? (5)