SUBJECT CODE: 11CH/MC/PC54

B.Sc. DEGREE EXAMINATION, NOVEMBER 2016
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. Eutectic temperature of lead- silver system is
    a) 567K   b) 576 K   c) 765 K   d) 675 K.

2. Degree of freedom at triple point of water is
    a) 0   b) 1   c) 2   d) 3.

3. The volume of solution obtained by the addition of 50mL of ethanol to 50mL of water is
    a) 100mL   b) less than 100mL   c) more than 100mL.

4. Immiscible pair of liquids at room temperature is
    a) water and ethyl alcohol   b) water and phenol
    c) water and acetic acid   d) water and chloroform.

5. A crystal having unit cell dimensions of $a \neq b \neq c$ and $\alpha = \beta = \gamma = 90^o$ is
    a) cubic   b) tetragonal   c) orthorhombic   d) monoclinic.

6. Crystal having no element of symmetry is
    a) KNO_3 b) NaCl   c) CsCl   d) $CuSO_4.5H_2O$.

7. Nematic liquid crystal is
    a) ethyl p-azoxybenzoate   b) p-azoxyanisole
    c) ethyl p-azoxy   cinnamate   d) PBLG.

8. Bragg's law is
    a) $n\lambda = 2d \sin\theta$ b) $\lambda = 2d \sin\theta$ c) $n\lambda = d \sin\theta$ d) $n/\lambda = 2d \sin\theta$.

9. Ideal solution among the following is
    a) benzene-toluene   b) water-Hcl   c) Phenol-water   d) ethanol-water.

10. Number of three fold axes of symmetry in a cubic crystal is
    a) 2   b) 3   c) 4   d) 6

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II. Fill in the blanks:

11. Iodine is _____ soluble in water than in chloroform.
12. Reduced phase rule is _____.
13. Number of phases in brine is _____.
14. CST of triethylamine - water system is _____.
15. Caesium chloride has _____- lattice.
16. Coordination number in KCl is _____.
17. On adding a pinch of sodium chloride to naphthalene its melting point _____.
18. Aniline can be purified by_____ distillation.
19. The total number of Bravais lattices in a crystal is _____.
20. Isotonic solutions have the same _____.

III. State whether true or false:

21. Methanol and water are partially miscible.
22. Glass is anisotropic.
23. Diamond is good abrasive.
24. Copper sulpahte monohydrate is blue in colour.
25. Osmosis depends on pressure.

IV. Answer in a line or two:

26. Define Unit cell.

27. Write Bragg's equation and explain the terms involved.

28. State Lever rule.

29. What are colligative properties?

30. Define – Critical solution temperature.

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COURSE : MAJOR CORE
PAPER : PHYSICAL CHEMISTRY-II
TIME : 2½ HOURS   MAX.MARKS : 70

SECTION – B   (5x6=30)
Answer any FIVE questions:

1. Discuss the structures of CsCl and ZnS.
2. Explain the phase diagram of water system.
3. Derive the relation between the freezing point depression of a solution and the mole fraction of the dissolved solute. How is it used in the determination of molar mass of a non volatile solute?
4. Draw and explain the phase diagrams of phenol-water and nicotine –water systems.
5. What are Miller indices? Represent the following planes (011), (100), (111), (101) and (110).
6. Discuss the theory and applications of neutron diffraction studies.
7. State Phase rule , define the various terms involved in it and derive the phase rule.

SECTION-C
Answer any TWO questions: (2X20=40)

8. (a) What are liquid crystals? Discuss the structures and main characteristics of any two types of liquid crystals?
   (b) Discuss the phase diagram of NaCl –water system.   (10+10)

9. (a) Discuss packing of ions in crystals.
   (b) Draw and explain the phase diagram of a simple eutectic system.   (10+10)

10. (a) State and explain the applications of Nernst distribution law.
    (b) Explain the vapour pressure- composition curves of completerly miscible binary liquid solutions.
    (c) State Raoult's law.   (8+10+2)

11. (a) Explain the principle of steam distillation taking a suitable example.   (10 +5+5)
    (b) An aqueous solution of a non volatile solution boils at $100.2^{\circ}C$. At what temperature will it freeze? Given, for water $K_b= 0.52$ K kg mol^{-1} and $K_f = 1.86$ K kg mol^{-1}.
    (c) Copper crystallises in a fcc lattice with edge length 360pm. If the density of copper is 8.94×10^3 kg m^{-3}, calculate the Avogadro's number.
       Given M_m of copper = 63.54 g mol^{-1}.

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