9. What are azeotropes ? Give example.

10. Mention the characteristics of an ideal solution.

11. What are efflorescent substances ? Give example.

12. Write any two advantages of amperometric titrations. **(5×1=5)**

SECTION – C

Answer **any four** questions. **Each** carries a weightage of **2** :

13. Write the Linde's process for the liquefaction of gases.

14. Calculate the EMF of the cell $Zn|Zn^{2+}(.001M)||Ag^{+}_{(0.1m)}|Ag$ at 25°C. Given $E°.Zn^{2+}|Zn = -0.76$ V and $E°Ag^{+}|Ag = 0.80$V.

15. Explain relaxation effect.

16. Sketch the B.P-composition curves of non ideal solutions.

17. What are simple eutectic systems ? Draw the labelled phase diagram of Pb-Ag system.

18. Write any four applications of IR spectroscopy. **(4×2=8)**

SECTION – D

Answer **any two** questions. **Each** carries a weightage of **4** :

19. i) Explain the structure of NaCl crystal.
    ii) Give any four applications of liquid crystals.

20. i) Explain the determination of pH of a solution by potentiometric method.
    ii) Derive an equation for the degree of hydrolysis of a salt formed from a strong acid and weak base.

21. Write briefly on
    i) Thermogravimetric analysis and
    ii) Differential thermal analysis. **(2×4=8)**

M 6307

Reg. No. : .....

Name : .....

IV Semester B.Sc. Degree (CCSS – Regular/Supple./Improv.) Examination, May 2014
Complementary Course in Chemistry
4CO6 CHE : CHEMISTRY FOR PHYSICAL SCIENCES

Time: 3 Hours Max. Weightage : 25

SECTION – A

Answer **all** questions. **Each** bunch of **four** questions carries a weightage of **1**. Choose the correct option.

1. i) The unit of Van der Waal's constant 'a' is
    a) atm dm^6mol^{-2} b) $dm^3\ mol^{-1}$
    c) litre atm mol^{-1} d) atm $dm^3\ mol^{-2}$

ii) At a particular temperature, the average velocity of CO_2 is comparable with that of
    a) CO b) SO_2
    c) O_2 d) N_2O

iii) The temperature above which a gas cannot be liquefied by applying pressure, is called
    a) Boyle temperature
    b) Critical temperature
    c) Inversion temperature
    d) Standard temperature

iv) The deviation of a gas from ideal behaviour is maximum at
    a) low P and low T b) high P and high T
    c) high P and low T d) low P and high T

2. i) Which among the following is an amorphous solid ?

a) NaCl b) Sucrose

c) Glass d) Ice

ii) Total number of Bravais lattices in a cubic crystal is

a) 14 b) 7

c) 4 d) 3

iii) In a body centred cubic arrangement of particles the radius (r) of the particle and edge length (a) of the unit cell are related as

a) $r=\sqrt{\frac{3}{4}}a$ b) $r=\sqrt{\frac{2}{4}}a$

c) $r = a/2$ d) $r=\frac{4a}{\sqrt{3}}$

iv) The Miller indices of a plane whose intercepts are 2a, 3b and c is given by

a) (231) b) (326)

c) (132) d) (623)

3. i) The anode reaction taking place in the Daniell cell is

a) $Cu^{2+} + 2\bar{e} \rightleftharpoons Cu$ b) $Zn \rightleftharpoons Zn^{2+} + 2\bar{e}$

c) $Zn^{2+} + 2\bar{e} \rightleftharpoons Zn$ d) $Cu \rightleftharpoons Cu^{2+} + 2\bar{e}$

ii) Calomel electrode is represented as

a) $Hg, Hg_2Cl_2| C\bar{l}$ b) $Hg, HgCl_2 | C\bar{l}$

c) $Ag, AgCl| C\bar{l}$ d) $Hg, Kcl | C\bar{l}$

iii) Which among the following forms a non ideal solution ?

a) Benzen + Toluene b) Ethanol + Water

c) Hexane + Heptane d) Ethanol + Methonol

iv) Phenol-water system is an example of

a) Completely miscible liquid pair

b) Immiscible liquid pair

c) Partially miscible liquid pair

d) Ideal solution

4. i) The phase rule can be mathematically formulated as

a) $F = C - P + 1$ b) $C = F - P + 2$

c) $F = C - P + 2$ d) $F + P = C - 2$

ii) A three component system among the following is

a) $CaCO_3(s) \rightleftharpoons CaO(s) + CO_2(g)$

b) $KCl - NaCl - H_2O$ system

c) Ice $\rightleftharpoons$ Liquid water $\rightleftharpoons$ Water vapour

d) Pb-Ag system

iii) The variance of a system is zero at

a) Triple point b) Futectic point

c) Metastable triple point d) All these

iv) A deliquescent substance among the following is

a) NaOH b) $Na_2CO_3IOH_2O$

c) $Na_2SO_4.IOH_2O$ d) $K_2Cr_2O_7$ **(4×1=4)**

SECTION – B

Answer **any five** questions. **Each** carries a weightage of **1** :

5. Calculate the RMS velocity of O_2 at 27°C.

6. Write the Bragg's equation and explain the terms

7. Write any two factors that affect the EMF of a cell.

8. The solubility product of AgCl is $1.7\times10^{-10} mol^2L^{-2}$ at 27°C. Calculate the solubility of AgCl in water at 27°C.