SECTION – C

Answer **any four** questions. **Each** question carries a weightage **2**.

13. From the laws of osmotic pressure derive the Van't Hoff equation.

14. What are the characteristics of ideal and non-ideal solutions ?

15. What are adsorption isotherms ? Explain the features of Freundlich adsorption isotherm.

16. Derive an equation for the pH of an acidic buffer.

17. Calculate the degree of hydrolysis and pH of a 10^{-2} M solution of CH_3COONa in water. Given the Ka value of CH_3COOH as 1.80×10^{-5} at 298 K.

18. Explain the construction and working of a calomel electrode. **(Weightage 4×2=8)**

SECTION – D

Answer **any two** questions. **Each** question carries a weightage **4**.

19. i) State and explain Nernst distribution law. Mention the important limitations of the law **(3)**

    ii) Distinguish between Deliquescence and efflorescence. **(1)**

20. i) State Kohlrausch's law. Give any three applications of the law **(2)**

    ii) Explain the conductometric titration curve for the titration of a strong acid against strong base. **(2)**

21. i) What is electrochemical series ? Mention any four applications of electrochemical series **(2)**

    ii) What are concentration cells ? How are they classified ? Give examples. **(2)**

(Weightage 2×4=8)

Reg. No. : .....

Name : .....

K16U 0158

VI Semester B.Sc. Degree (CCSS-Reg./Supple./Improv.) Examination, May 2016
Core Course in Chemistry
6B 13 CHE : PHYSICAL CHEMISTRY – II

Time : 3 Hours Max. Weightage : 25

SECTION – A

Answer **all** questions. **Each** bunch of **four** questions carries a weightage **1**.

1. i) Which among the following is an example of a C2v molecule ?
   A) NH_3 B) H_2O
   C) BF_3 D) CO_2

   ii) Linear molecules with centre of symmetry belong to the point group
   A) D_{3n} B) C_{3v}
   C) $D_{\infty n}$ D) $C_{\infty v}$

   iii) Which among the following is not a colligative property ?
   A) Osmotic pressure B) Surface tension
   C) Elevation of BP D) Depression in FP

   iv) The approximate value of molecular mass obtained for NaCl, by colligative property measurement of its aqueous solution is
   A) 58.5 B) 117
   C) 29 D) 87.5

2. i) Equimolar aqueous solution of which of the following substances will have highest B.P. ?
   A) Urea B) Sucrose
   C) NaCl D) K_2SO_4

ii) Temperature above which two partially miscible liquids become completely miscible in all proportions, is called

A) Eutectic temperature

B) Critical temperature

C) Critical solution temperature

D) Miscibility temperature

iii) Tyndall effect is an example of _____ property of colloid.

A) Mechanical B) Electrical

C) Optical D) Electrokinetic

iv) When the same quantity of electricity is passed, the amount deposited at the cathode is minimum in the case of

A) $Al(NO_3)_3$ solution B) $CuSO_4$ solution

C) $ZnSO_4$ solution D) $AgNO_3$ solution

3. i) With increase in dilution, the equivalent conductance of a strong electrolyte

A) goes on increasing

B) goes on decreasing

C) goes on increasing and reaches a limiting value

D) first decreases and then increases

ii) For the electrolyte Na_2SO_4, the mean molal activity coefficient $\gamma\pm$, molality 'm' and activity 'a' are related as

A) $a = 4m^3(\gamma\pm)^3$ B) $a=(m\gamma\pm)^2$

C) $a = 2m^3(\gamma\pm)^3$ D) $a=4m(\gamma\pm)^3$

iii) A Lewis acid among the following is

A) NH_3 B) ROH

C) BF_3 D) $C\bar{N}$

iv) Aqueous solution of the salt, which is basic in nature is

A) Na_2CO_3 B) NH_4Cl

C) K_2SO_4 D) NaCl

4. i) A solution of $CuSO_4$ in which copper rod is immersed is diluted 10 times at 25° C. Then the electrode potential will

A) remain unchanged B) decrease by 0.03 V

C) increase by 0.03 V D) decrease by 0.059 V

ii) Which is not true ?

A) In an electrochemical cell, the anode is negative

B) In an electrolytic cell the anode is positive

C) The electrode potential of SHE is taken as unity

D) The pH of the solution in SHE is zero

iii) A hydrogen electrode is set up with a solution of pH = 3. Then the electrode potential at 25° C will be, approximately

A) – 0.18 V B) 0.059 V

C) 0.18 V D) Zero

iv) For the cell $Zn\,|\,Zn^{2+}(1M)\,\|\,(Cu^{2+}(1M)\,|\,Cu$, the Ecell value at 25° C is 1.1V. This can be increased by

A) increasing the concentration of Zn^{2+}

B) increasing the concentration of Cu^{2+}

C) lowering the temperature

D) both by lowering temperature and increasing the concentration of Cu^{2+}

(Weightage 4×1=4)

SECTION – B

Answer **any five** questions. **Each** question carries a weightage **1**.

5. Improper axis of symmetry is also called rotation reflection axis. Why ?

6. Identify the symmetry elements present in NH_3 molecule.

7. When 0.5 g of a non-volatile solute is added to 39 g of benzene, its vapour pressure lowered from 0.850 bar to 0.845 bar. Calculate the molecular mass of the solute.

8. Explain Hardy-Schulz rule.

9. What are emulsions ? How are they classified ?

10. State the Debye Huckel limiting law. Why it is known so ?

11. What are hard and soft acids ? Give example.

12. Define overvoltage. Mention any two consequences of overvoltage.

(Weightage 5×1=5)