



**AAI-003-001608**      Seat No. \_\_\_\_\_

## **B. Sc. (Sem. VI) (CBCS) Examination**

March / April - 2016

## **Chemistry : Paper - C-603**

**(Physical Chemistry & Analytical Chemistry - VI)  
(New Course)**

**Faculty Code : 003**

**Subject Code : 001608**

Time :  $2\frac{1}{2}$  Hours]

[Total Marks : 70]

**Instructions :** (1) Q. 1 is MCQ which carries 20 marks.

(2) MCQs answers are to be written on the same answer sheet.

(3) Q. 2 and 3 carry 25 marks each with internal option.

## **SECTION - I**

(Write the correct option number and answer)

(1) With the use of 3<sup>rd</sup> law of thermodynamics which value can be calculated ?

(A)  $\Delta S^\circ$

(B)  $\Delta G^\circ$

(C) K

(D) All of these

(2) Identify example of intensive property.

(A) Internal Energy (B) Refractive Index



(10) Unit of conductivity is.....

(11) Upon dilution of solution, which value decreases ?

- (A) Conductance
- (B) Specific conductance
- (C) Equivalent conductance
- (D) Molar conductance

(12) Degree of dissociation of weak acid can be achieved by.....

(A)  $\lambda_\infty / \lambda c$       (B)  $\lambda_\infty \cdot \lambda c$   
 (C)  $\lambda c / \lambda_\infty$       (D)  $1 / \lambda_\infty$

(13) To find value of  $\lambda_{\infty}(CH_3COOH)$ , which value is required ?

(A)  $\lambda_\infty(CH_3COONa)$       (B)  $\lambda_\infty(HCl)$   
 (C)  $\lambda_\infty(NaCl)$       (D) All of these

(14) To separate gama-carotene from carrot by column chromatography, which adsorbent is used ?

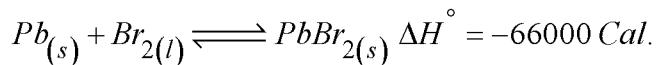
(15) In which chromatography, stationary phase is taken solid ?



## SECTION-II

**2 (a) Answer any three of the following : 6**

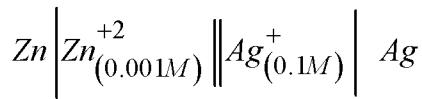
- (1) Give exception to the third law of thermodynamics.
- (2) Derive effect of pressure on chemical potential.
- (3) How pH of solution can determine by using glass electrode ?
- (4) What is electrode - concentration cell ? Draw only figure of electrode-concentration cell.
- (5) What is average activity and average activity coefficient ?
- (6) For reaction :



Values of absolute entropies of Pb, Br<sub>2</sub> and PbBr<sub>2</sub> are 15.5, 36.8 and 38.6 cal/mole at 298K. Find  $\Delta G^\circ$ .

**(b) Answer any three of the following : 9**

- (1) Determine absolute entropy of liquids and gases.
- (2) Explain Nernst distribution law.
- (3) Derive equation of mean activity (a<sub>2</sub>) for univalent electrolyte.
- (4) How ionic product of water (K<sub>w</sub>) can obtain by help of EMF measurement ?
- (5) Explain electrolyte concentration cell.
- (6) Calculate E<sub>cell</sub> and give cell reaction.



$$E^\circ_{Ag^+ / Ag} = +0.80 \text{ V}, \quad E^\circ_{Zn^{+2} / Zn} = -0.76 \text{ V}$$

(c) Answer any two of the following : 10

- (1) State third law of thermodynamics. Explain Nernst heat theorem.
- (2) Explain the concept of chemical potential. Derive Gibbs-Duhem equation.
- (3) Derive Debye-Hückel limiting law equation.
- (4) What is LJP ? How it can be eliminate ?
- (5) Explain determination of solubility of sparingly soluble salt and transport number of ion by measurement of EMF.

**3** (a) Answer any three of the following : 6

- (1) Explain : Equivalent conductance.
- (2) Define : Stationary phase, Mobile phase.
- (3) Discuss method of Preparation of standard edta solution.
- (4) Draw figure and write reaction of calomel electrode.
- (5) Explain two dimensional paper chromatography.
- (6) Write factors affecting conductance of solution.

(b) Answer any three of the following : 9

- (1) Explain platinum electrode and platinization of platinum electrode.
- (2) Discuss : Visualization methods in chromatography.
- (3) Write applications of conductometry method.
- (4) Discuss : Eriochrome black-T.
- (5) Write note on Quinhydrone electrode.
- (6) Explain circular paper chromatography.

(c) Answer any two of the following : 10

- (1) What is conductometric titration ? Discuss titration of weak acid by strong base by conductometric method.
- (2) Discuss principle and method of column chromatography.
- (3) Explain principle of redox titration. Discuss titration of  $\text{FeSO}_4$  by  $\text{Ce}(\text{SO}_4)_2$  potentiometrically.
- (4) Discuss any three type of edta titrations.
- (5) Explain ion exchange resins. Give principle and working of resins.

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