



JC-003-001608

Seat No. \_\_\_\_\_

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

August – 2019

**C-603 : Chemistry**

*(Physical & Analytical Chemistry)*

**Faculty Code : 003**

**Subject Code : 001608**

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

[Total Marks : 70

1 Answer in brief : 20

- (1) Write Nernst statement of 3rd law of thermodynamics.
- (2) According to which theory heat capacity of crystalline substance at low temperature is  $C_p = C_v = \alpha T^3$  ?
- (3) Give examples of extensive properties.
- (4) Write the equation of Raoult's law.
- (5) Define activity coefficient.
- (6) What is the equation of ionic strength.
- (7) What is the ionic strength of 0.01m KCl solution.
- (8) Define electrochemical cell.
- (9) If solution contains  $Ag^+$  ions then which solution is used in salt bridge ?
- (10) Pt,  $H_{2(p1)}/H^+$  ion solution/ $H_{2(p2)}$ , Pt is which type of concentration cell ?
- (11) What is the unit of conductivity ?
- (12) Give the full form of GLC.
- (13) Define  $R_f$  value.
- (14)  $CaCO_3$  is a medium adsorbant (true or false) ?
- (15) Which salt of EDTA is used to prepare standard EDTA solution ?
- (16) What is ligand ?
- (17) Define :  $R_x$  value.
- (18) Give the full form of FID.
- (19) What is back titration ?
- (20) Who was the first to give the idea of chromatography ?

- 2 (a) Answer any **three** : 6
- (1) Write any two statements of 3<sup>rd</sup> law of thermodynamics.
  - (2) Explain partial molar property.
  - (3) Calculate ionic strength of 0.0001m AlCl<sub>3</sub> solution.
  - (4) Write the equation of mean activity and mean activity coefficient.
  - (5) Define liquid junction potential.
  - (6) How to determine transport number using emf measurement.
- (b) Answer any **three** : 9
- (1) Explain Nernst heat theorem.
  - (2) Explain the variation of chemical potential with temperature.
  - (3) Derive Henry's law using chemical potential.
  - (4) How to determine valency of metal ion using emf measurement.
  - (5) Explain electrolyte concentration cell.
  - (6) Short note on ionic strength.
- (c) Answer any **two** : 10
- (1) Derive Gibbs Duhem equation.
  - (2) Derive  $S_T = C_p/3$ .
  - (3) Discuss EMF method for determination of activity coefficient.
  - (4) Describe the determination of ionic product of water (K<sub>w</sub>) by emf method.
  - (5) Derive equation of emf of concentration cell without transference.
- 3 (a) Answer any **three** : 6
- (1) Explain cell constant of conductivity cell.
  - (2) What is equivalent conductance.
  - (3) Write Velcher's law.
  - (4) Name any two methods to prepare TLC plate.
  - (5) Which factors affect R<sub>f</sub> value ?
  - (6) What are the advantages of hydrogen electrode ?

(b) Answer any **three** : **9**

- (1) Explain conductometric titration of strong acid against weak base.
- (2) Explain Kohlrausch law.
- (3) Give advantages of TLC over other chromatography.
- (4) Explain column chromatography.
- (5) Short note on Eriochrome black T.
- (6) Discuss redox titration.

(c) Answer any **two** : **10**

- (1) What is conductometry titration ? Explain titration of weak acid and strong base by conductometry.
- (2) Discuss different types of paper chromatography.
- (3) Explain ion exchange resin.
- (4) Discuss titration of  $\text{FeSO}_4$  against  $\text{CeSO}_4$  potentiometrically.
- (5) Explain with the help of  $\text{p}^{\text{H}}$  metry method to determine dissociation constant of weak acid.

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