647510 **BSCphyCC6030** **Seat No :_____**

B.Sc. Semester - 6 (*CBCS*) Examination
Oct/Nov -2020
PHYSICAL AND ANALYTICAL CHEMISTRY (CORE)

Time: 2:00 Hours **Marks: 56**

Instructions:

1. Figures to the right indicate marks.
2. There are five questions in the question paper.
3. Answer any four of the following questions.

Q. 1 (A) Calculate the ionic strength of mixture of 50 ml 0.04M KCl and 50 ml of 0.08M Na_2SO_4. (4)

Q.1 (B) Answer any two questions (10)

(1) Describe the determination of absolute entropy of solid and liquid.
(2) Explain the emf method to determine activity coefficient ionic solution.
(3) Concentration of ferrous sulphate solution is 2×10^{-3}M. Calculate activity coefficient and mean activity coefficieient of both ions and activity of positive ions mean (A=0.509)

Q. 2 (A) At 25°C temperature emf of cell Ag/AgCl in 0.1M KCl//$AgNO_3$(0.1M) cell is 0.45 KCl and $AgNO_3$ solution is 85% and 82% ionized, respectively. Calculate solubility product of AgCl. (F=96500 coulomb, R = 8.14 Joule/mole) (4)

Q. 2 (B) Answer any two questions (10)

(1) Derive the equation for emf of electrolyte concentration with transference.
(2) Explain electrode concentration cells.
(3) Discuss the determination of dissociation constant of weak acid emf method.

Q. 3 (A) Explain significant figure rules for addition and multiplication with example. (4)

Q. 3 (B) Answer any two questions (10)

(1) Explain the various types of error.
(2) Drive Nernst distribution law by partial molar property.
(3) A sample contains 0.123% $CaCO_3$. By new method it was found 0.112%, 0.115, 0.118% and 0.119%. Is there any bias in new method? (Standard deviation=0.0032, t-Table value for 3 degree of freedom is 3.18)

Q. 4 (A) Name the factors affecting R_f value. (4)

Q. 4 (B) Answer any two questions (10)

(1) Describe thin layer chromatography.
(2) Discuss gas liquid chromatography.
(3) Describe the applications of ion exchange chromatography.

Q. 5 (A) Explain the principle of borax bead test with chemical reactions. (4)

Q. 5 (B) Answer any two questions (10)

(1) Discuss the separation of Cu^{+2} and Cd^{+2} ions.
(2) Explain glass electrode. Write its advantages and disadvantages.
(3) Describe argentometric titration by potentiometry.

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