

S.Y.B.SC. SEM – IV (2014 COURSE) : WINTER - 2017

SUBJECT : CHEMISTRY : PHYSICAL & ANALYTICAL CHEMISTRY – IV (C – 41)

Day : Tuesday  
Date : 31/10/2017

Time : 03.00 PM TO 05.00 PM  
Max. Marks : 40

**W-2017-0632**

**N.B.:**

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Use of log table / calculator is **ALLOWED**.
- 4) Draw neat and labeled diagram **WHEREVER** necessary.
- 5) Answers to both the sections should be written in the **SAME** answer book.

**SECTION – I (Physical Chemistry)**

- Q.1** Attempt **ANY TWO** of the following: [10]
- a) Explain the term mole fraction.
  - b) What are simultaneous reactions? Discuss reversible reactions with suitable examples.
  - c) Distinguish between ideal and non-ideal solutions.
- Q.2** Attempt **ANY ONE** of the following: [05]
- a) Describe the transition state theory.
  - b) Explain two applications of colloids with respect to foods and medicine.
- Q.3** Solve **ANY TWO** of the following: [05]
- a) The strength of HCl solution is 1.825 g per liter. If the equivalent weight of HCl is 36.5, what is its normality?
  - b) Calculate the normality of the solution containing  $2.45 \times 10^{-3}$  kg of  $\text{H}_2\text{SO}_4$  in  $3\text{dm}^3$  of solution. (Atomic weights: H = 1, S = 32, O = 16)
  - c) If the rate of reaction gets doubled from 298 K to 308 K. Calculate the energy of activation. ( $R = 8.314 \text{ J k}^{-1} \text{ mol}^{-1}$ )

**SECTION – II (Analytical Chemistry)**

- Q.4** Attempt **ANY TWO** of the following: [10]
- a) Describe determination of chloride by Mohr method.
  - b) Describe standardization of sodium thiosulphate by potassium dichromate.
  - c) Draw a titration curve of strong acid and strong base. Mention the suitable indicator.
- Q.5** Attempt **ANY ONE** of the following: [05]
- a) Explain primary and secondary standard substances with suitable examples.
  - b) How will you calibrate volumetric flask?
- Q.6** Solve **ANY TWO** of the following: [05]
- a) How many ml of 0.2 N HCl are required to neutralize 25.0 ml of 0.1 N NaOH?
  - b) How much water should be added to 250 ml of 0.1 N NaOH to give 0.05 N solution?
  - c) Calculate the normality of  $\text{HNO}_3$  solution when 23 ml of it react with 20 ml of 0.12 N NaOH solution.

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