

**S.Y.B.SC. SEM – III (CBCS - 2016 COURSE) : WINTER -
2017**

SUBJECT : CHEMISTRY : PHYSICAL & ANALYTICAL CHEMISTRY – I

Day : Saturday
Date : 28/10/2017

Time : 11.00 A.M. TO 02.00 PM
Max. Marks :60

W-2017-0571

N. B. :

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Use of scientific calculator is **ALLOWED**.
- 4) Answers to the both sections should be written in the **SAME** answer book.

SECTION – I (Physical Chemistry)

- Q.1** Attempt any **TWO** of the following (12)
- a) Deduce the equation, $\frac{W}{q_2} = \frac{T_2 - T_1}{T_2}$, thermodynamically.
 - b) Derive an expression for entropy change of mixing of ideal gases.
 - c) What is conductor? Explain electronic and electrolytic conductors.
- Q.2** Attempt any **THREE** of the following (12)
- a) A heat engine works between 127°C and 27°C. Calculate the percentage efficiency of the engine.
 - b) The resistance of a decinormal solution of an electrolyte was found to be 250 ohms. Calculate the specific and equivalent conductivities of the solution if the electrodes in the cell are 2 cm apart and have area of 4 cm².
 - c) Calculate the increase in entropy of 3 moles of an ideal gas as it changes from 300 K at 0.2 x 10⁵ Pa to 1000 K at 2 x 10⁵ Pa. (R = 8.314J mol⁻¹, C_p = 29.29 Jk⁻¹mol⁻¹)
 - d) Explain equivalent and molecular conductivities.
- Q.3** A) Attempt any **ONE** of the following (06)
- a) Discuss the term transport number.
 - b) What are the inadequacies of first law of thermodynamics? Give different statements of second law of thermodynamics.

SECTION – II (Analytical Chemistry)

- Q.3** B) Attempt any **ONE** of the following (06)
- a) What is group reagent? Give its suitable example.
 - b) Explain estimation of sulphur and phosphorous by Curius method.
- Q.4** Attempt any **TWO** of the following (12)
- a) Discuss the application of common ion effect of H₂S in presence of HCl and NH₄OH in presence of NH₄Cl in qualitative analysis.
 - b) What do you understand by the term significant figure? Explain it with suitable example.
 - c) Discuss Liebig's method for the estimation of Carbon and Hydrogen.
- Q.5** Attempt any **FOUR** of the following (12)
- a) Explain sampling of solid.
 - b) Discuss the use of ammonium sulphide in separation of Group-II cation.
 - c) Calculate the proper number of significant figures in each of the following:
(i) 78.000 (ii) 0.0125 (iii) 1.2500
 - d) If 3.85 gm sample of material is reported as 3.80 gm, find the absolute error and relative error.
 - e) Perform the required operations and express the results in proper number of significant figures:
(i) 43.1 + 4.31 + 48.8 (ii) 0.0025 + 4.1167 + 5.9071.
 - f) What are the tests usually carried out in inorganic qualitative analysis.