

BACHELOR OF SCIENCE (CBCS-2018 COURSE)
S. Y. B. Sc. Sem-III : WINTER :- 2021
SUBJECT: CHEMISTRY : PHYSICAL & ANALYTICAL CHEMISTRY-I

Day : Tuesday
Date 25-01-2022

W-18350-2021

Time : 10:00 AM-01:00 PM
Max. Marks: 60

N.B.:

- 1) All questions are **COMPULSORY**.
 - 2) Figures to the right indicate **FULL** marks.
 - 3) Both the Sections should be written in Same Answer Book.
 - 4) Use of Scientific calculator is allowed
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SECTION – I

- Q.1** Attempt **ANY TWO** of the following:- (12)
- a) Explain Spontaneous and non-spontaneous processes.
 - b) Discuss the terms specific resistance and specific conductance.
 - c) What is an entropy? Give its units. Entropy is a measure of order and disorder of a system. Explain.
- Q.2** Attempt **ANY THREE** of the following:- (12)
- a) In a conductance cell, the two electrodes are 1.6 cm apart and have an area of cross-section 3.2 cm^2 . Find the cell constant.
 - b) Calculate the minimum amount of heat that must be withdrawn from the hot reservoir at 410 K to obtain work equal to 15 KJ per cycle. The lower temperature of the cycle is 290K.
 - c) Calculate the entropy change involved in the isothermal reversible expansion of 5 moles of an ideal gas from a volume of 5 dm^3 to a volume of 50 dm^3 at 300 K. ($R=8.314 \text{ J mol}^{-1}$)
 - d) State and explain Kohlrausch's law of independent migration of ions.
- Q.3** A) Answer **ANY ONE** of the following:- (06)
- a) What are the inadequacies of the first law of thermodynamics? State second law of thermodynamics in different ways.
 - b) Derive an expression for entropy change of an ideal gas at constant volume and constant pressure.

SECTION - II

- Q.3** B) Answer **ANY ONE** of the following:- (06)
- a) Explain Duma's method of estimations of Nitrogen.
 - b) Explain the scheme of classification of cations into groups.
- Q.4** Attempt **ANY TWO** of the following:- (12)
- a) Explain the Carius method of estimating Sulphur in an organic compound.
 - b) Explain Accuracy and Precision with example.
 - c) Write a note on "Solubility Product".
- Q.5** Answer **ANY FOUR** of the following (12)
- a) Discuss the removal of phosphate ion using ferric chloride.
 - b) Explain the use of NaOH or KOH in separation of group II cations.
 - c) Write a note on 'Indeterminate Errors'.
 - d) Calculate the proper number of significant figures in each of the following:-
i) 96.850 ii) 00.800 iii) 19.020
 - e) If 79.85gm sample of material is reported as 70.0gm, find absolute error and relative error.
 - f) Calculate deviation for the following set of data.
40.02, 40.06, 40.08.

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