

S.Y.B.SC. SEM – III (CBCS - 2016 Course) : WINTER - 2018
SUBJECT: CHEMISTRY: PHYSICAL & ANALYTICAL CHEMISTRY-I

Day: Saturday
Date: 13/10/2018

W-2018-0710

Time: 11.00 A.M. To 02.00 P.M.
Max. Marks: 60

N.B:

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Used 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) Obtain the equation for efficiency of Carnot's cycle.
 - b) Discuss the moving boundary method for the determination of transport number
 - c) Derive an expression for entropy change in an isothermal reversible process in an isolated system
- Q.2** Attempt any **THREE** of the following: (12)
- a) What is the principle of the conductometric titration? Explain the procedure of conductometric titration.
 - b) Calculate the minimum amount of heat that must be drawn from the hot reservoir at 410K to obtain work equal to 15 KJ per cycle. The lower temperature of the cycle is 290 K.
 - c) The specific conductance of N/5 solution of ZnSO₄ at 298 K is 0.02107 Ohm⁻¹cm⁻¹. Calculate equivalent and molecular conductances of ZnSO₄ solution.
 - d) A heat engine works between 227^oC and 127^oC. Calculate the percentage efficiency of the engine.
- Q.3** A) Attempt any **ONE** of the following: (06)
- a) Explain the use of conductivity water in the measurement of conductance of the solution.
 - b) Derive an equation for entropy change on mixing of ideal gases.

SECTION-II (Analytical Chemistry)

- Q.3** B) Attempt any **ONE** of the following: (06)
- a) What do you understand by the term 'significant figures'? Explain it with suitable examples.
 - b) Elaborate on 'Use of common ion effect in qualitative analysis'.
- Q.4** Attempt any **TWO** of the following: (12)
- a) Describe Duma's method of estimation of nitrogen in an organic compound.
 - b) What is the basis of sampling? Discuss it in detail.
 - c) Explain Carius method of estimating sulphur in an organic compound.
- Q.5** Attempt any **FOUR** of the following: (12)
- a) Explain borate removal scheme in qualitative analysis.
 - b) Explain Accuracy and Precision with suitable example.
 - c) Explain the use of NaOH or KOH in the separation of group II cations
 - d) Calculate the proper number of significant figures in each of the following:
i)85.007 ii)0.0800 iii)3.580
 - e) If 8.54 gm sample of material is reported as 8.50 gm, find the absolute error and relative error.
 - f) The percentage of chloride in MgCl₂ was reported by different persons as 32.64,32.61 and 32.53%. Calculate mean deviation.

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