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SEAT No. :

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S.Y.B.Sc.

CHEMISTRY

CH-211: Physical and Analytical Chemistry

(2013 Pattern) (Semester - I) (Paper-I)

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

- 1) All questions are compulsory.*
- 2) Neat diagrams must be drawn wherever necessary.*
- 3) Figures to the right indicate full marks.*
- 4) Use of calculator is allowed.*
- 5) Answer to both sections should be written in same answer book.*

SECTION-I

(Physical Chemistry)

Q1) Answer the following:

[5]

- a) Define order of reaction.
- b) What is rate of reaction?
- c) State Grotthus-Draper's law.
- d) Define photosynthesis.
- e) When process of extraction is more economical and efficient?

Q2) a) Answer Any Two of the following:

[6]

- i) Deduce the equation for velocity constant for second order reaction with unequal initial concentration.
- ii) Draw the schematic diagram of the apparatus used for the determination of quantum yield.
- iii) Give the characteristics of first order reaction.

P.T.O.

- b) Attempt Any Two of the following: [4]
- i) Explain the term chemiluminescence.
 - ii) Give difference between the first and second order reaction with respect to rate constant and half life period.
 - iii) What is difference between thermal and photochemical reaction?

Q3) Solve Any Two of the following: [5]

- a) The rate constant of first order reaction is $6.4 \times 10^{-3} \text{ sec}^{-1}$ at 25°C . Find the time required to complete 75% of the reaction.
- b) The absorbance of $1.5 \times 10^{-3}\text{m}$ solution of a sample was found to be 0.183 at a wavelength 440 nm in a cell of 1 cm path length. Find
 - i) transmitted
 - ii) Molar extinction coefficient.
- c) Calculate the amount of acid extracted from two litre of aqueous solution containing 50 gm of an acid on extracting with 500 cm^3 of ether every time in 3 lots. If partition coefficient of acid in water to ether is 5.6.

SECTION-II

(Analytical Chemistry)

Q4) Answer the following: [5]

- a) Define sampling.
- b) What is Error?
- c) Which is group reagent for V group?
- d) Write chemical reaction for detection of phenol.
- e) Define common Ion Effect.

Q5) a) Answer any two of the following: [6]

- i) What is solubility product? Explain the role of this concept in separation of basic radicals.
- ii) Explain sodium fusion test for detection of Nitrogen and Oxygen.
- iii) What is empirical formula? Explain carius method for estimation of sulphur.

b) Attempt any two of the following: [4]

- i) How are sample of gas obtained?
- ii) Explain different methods used to minimise the error.
- iii) Explain the method of removal of phosphate in qualitative analysis.

Q6) Solve any two of the following: [5]

- a) The percentage of component M in compound MN were found to be 30.32, 30.33, 30.20, 30.10 and 30.58%. Calculate mean deviation and relative deviation.
- b) An organic compound on elemental analysis was found to contain carbon = 77.42% Hydrogen = 7.53 and nitrogen = 15.05% . Calculate its molecular formula.

If its molecular weight is 93.

- c) The concentration of Cu^{+2} metal ion in solution is 0.25M. What should be the concentration of sulphide ion required to just cause the precipitation of CuS. (K_{sp} of CuS = 8.5×10^{-45}).

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