

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

Day : Friday
Date 21-01-2022

W-18295-2021

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) Answers to both the sections should be written in **SAME** answer book.
- 3) Draw neat and labelled diagrams wherever necessary.
- 4) Use of **log table/ scientific calculator** is allowed.

SECTION-I (Physical Chemistry)

- Q.1** Attempt any **TWO** of the following: (12)
- a) Explain the term molecularity of the reaction.
 - b) Discuss the modifications of the distribution law with reference to association and dissociation of solute.
 - c) Give definitions of the slope. What is significance of the positive and negative slope?
- Q.2** Attempt any **TWO** of the following: (12)
- a) List the limitations of the distribution law.
 - b) Obtain the equation for the rate constant of the first order reaction.
 - c) Explain the reaction for decomposition of the nitrogen pentoxide.
- Q.3** Attempt any **THREE** of the following: (12)
- a) Give the examples of third order reactions.
 - b) If $y = (x^2 - 2)(x + 2)$, $\frac{dy}{dx} = ?$
 - c) Evaluate $\int x^{1/4} dx$
 - d) Iodine has the same molecular weight in water and carbon disulphide. When varying amounts of iodine were shaken with water and carbon disulphide mixture, the following results were obtained:
- | | | | |
|---------------------------|----------|-----------|-----------|
| C_{H_2O} (moles/ litre) | 0.001579 | 0.0006299 | 0.0003938 |
| C_{CS_2} (mole/ litre) | 0.6536 | 0.2580 | 0.1614 |
- Calculate the partition coefficient of iodine between carbon disulphide and water.

SECTION-II (Inorganic Chemistry)

- Q.4** Attempt any **TWO** of the following: (12)
- a) What do you mean by concentration of a solution? Explain three methods used to express the concentration of a solution?
 - b) Calculate oxidation number of:
i) B in H_3BO_3 ii) S in $Na_2S_2O_3$ iii) Cl in $KClO_3$
 - c) What will be the normality of following solutions?
i) 200 ml containing 1.27 iodine (eq. wt. of Iodine = 127)
ii) 100 ml containing 0.315 nitric acid (eq. wt. of HNO_3 = 63)
- Q.5** Attempt any **FOUR** of the following: (12)
- a) What are primary and secondary standard substances?
 - b) Define oxidation number. Calculate oxidation number of P in $Ca_3(PO_4)_2$
 - c) What do you mean by oxidizing agent and reducing agent?
 - d) If 15 ml of solution of HCl were found to neutralize 22.5 ml of 0.12N NaOH solution. What is the strength of acid solution in grams per liter?
 - e) What do you mean by a normal solution? How will you prepare 1N solution of $KMnO_4$ (eq. wt. = 31.6)
 - f) Explain following terms:
i) Acidity of a base ii) Basicity of a acid

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