

BACHELOR OF SCIENCE (CBCS-2018 COURSE)
F. Y. B. Sc. Sem-I : WINTER- 2022
SUBJECT : CHEMISTRY : PHYSICAL & INORGANIC CHEMISTRY-I

Day : Friday

Time : 10:00 AM-01:00 PM

Date : 9/12/2022

W-18295-2022

Max. Marks : 60

N.B.

- 1) All questions are **COMPULSORY**.
- 2) Figures to the **RIGHT** indicate **FULL** marks.
- 3) Use of **log table / scientific calculator** is allowed.
- 4) Answer to both the sections should be written in the **SAME** answer book.

SECTION – I (PHYSICAL CHEMISTRY)

- Q.1** Attempt **ANY TWO** of the following: (12)
- a) Derive the equation for velocity constant of second order reaction in which $a = b$.
 - b) Discuss the modifications of distribution law.
 - c) Define slope. Give the significance of positive and negative slopes.
- Q.2** Attempt **ANY TWO** of the following: (12)
- a) Discuss the term molecularity of the reaction.
 - b) What are the limitations of the distribution law?
 - c) Elaborate on Pseudo-unimolecular reaction.
- Q.3** Attempt **ANY THREE** of the following: (12)
- a) Give examples of third order reaction.
 - b) If $y = \frac{1+x^2}{1-x^2}$, find $\frac{dy}{dx}$.
 - c) Evaluate $\int 2x^2 \left(3x^2 + \frac{5}{x^2} \right) dx$.
 - d) The solubility of iodine in water at 24°C is 0.34 gm/lit. Calculate the solubility of iodine in CCl_4 if distribution coefficient of iodine in water and CCl_4 is 1.14×10^{-2} .

SECTION – II (INORGANIC CHEMISTRY)

- Q.4** Attempt **ANY TWO** of the following: (12)
- a) What is standard solution? Explain meaning of primary standard substance and secondary standard substance. What are the requirements of a good primary standard solution?
 - b) What is the oxidation number of :
i) N in HNO_3 ii) Mn in KMnO_4 iii) P in H_3PO_3 .
 - c) What will be the volume of the solution having following normalities and containing following weights of substances?
 - i) 0.05 N solution containing 3.1 g of $\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$.
(eq.wt. of $\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O} = 248$)
 - ii) 0.1 N solution containing 2.45 g of $\text{K}_2\text{Cr}_2\text{O}_7$ (eq.wt. = 49).

P.T.O.

Q.5 Attempt **ANY FOUR** of the following: **(12)**

- a) Define following terms :
 - i) Reduction
 - ii) Oxidizing agent
 - iii) Oxidation state.
- b) What is the volume of 0.2 N solution of NaOH required to neutralize 8 ml of 0.05 N sulphuric acid solution?
- c) Explain following terms :
 - i) Normality
 - ii) Molarity
 - iii) Basicity of the acid.
- d) What is meant by 'normal solution'? How will you prepare 'normal solution of oxalic acid'? (At. Wts. H = 1, C=12, O=16)
- e) If the strength of HCl solution is 1.825 g/lit and equivalent wt. of HCl is 36.5 then what is its normality?
- f) Calculate oxidation state of :
 - i) S in H_2SO_4
 - ii) Cl in KClO_4
 - iii) Cr in K_2CrO_4

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