

[4]

- b) Prove that buffer capacity is maximum at the half neutralisation point of corresponding acid and base, 5
- c) 25 ml of 0.3 (N) HCl acid is added to a 25ml of 0.6 (N) aqueous ammonia solution. What will be the pH of the resulting solution? 3
- d) What is buffer solution? Discuss the mechanism of buffer action. 1+2

Ex/B.Sc/CHEM/S/12/IV/A/2019(Old)

FIRST B.Sc. EXAMINATION, 2019

(2nd Semester, Old Syllabus)

CHEMISTRY (SUBSIDIARY)

PAPER - IVS

Time : Two hours

Full Marks : 50

Use a separate answerscript for each group.

GROUP - A

1. a) The reaction $A \rightarrow \text{Products}$ is " $1/2$ " order with respect to A. Deduce the integrated rate law. Find the expression of half-life period. 3+2
- b) Write down Michaelis Menten equation explaining each term. Give a representative plot of rate versus concentration of substrate. What is the unit of Michaelis constant? 2+2+1
- c) Find the time required for the decomposition of $(n-1)/n$ fraction of initial amount of A undergoing a first order reaction $A \rightarrow \text{Products}$. $1 \frac{1}{2} \times 2$

Or

Draw the plot of rate and concentration of reactant as a function of time for zero order reaction. 3

[Turn over

[2]

- d) For a zero order reaction half-life period is independent of initial concentration of reactant : Justify/criticize.

Or

For a reaction $A \rightarrow$ products, the plot of $1/C_A$ versus time is a straight line with a positive slope and intercept. Find the order of the reaction.

- e) The rate constant of a reaction becomes double when temperature changes from 27°C to 37°C . Find activation energy for the reaction. 2

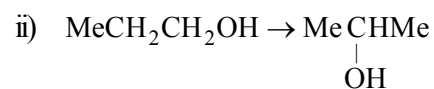
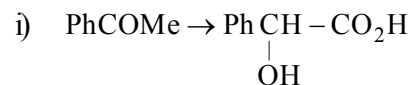
GROUP - B

2. a) i) "Aldol condensation between two different aliphatic aldehydes having α -H does not give fruitful reaction"—Account for the statement with suitable examples. $2\frac{1}{2}$

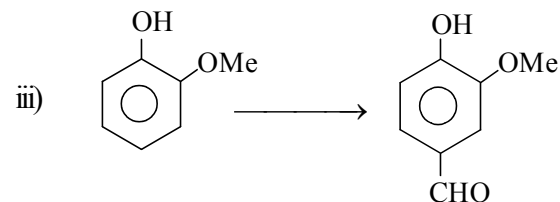
- ii) Write the preparation of aldehyde using an oxidative method. 1

- iii) How is primary alcohol distinguished chemically from a secondary alcohol? $1\frac{1}{2}$

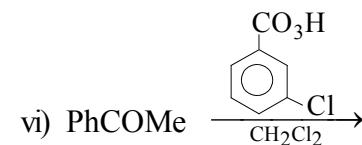
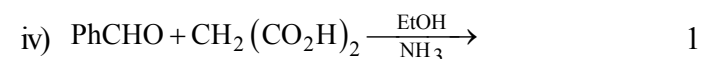
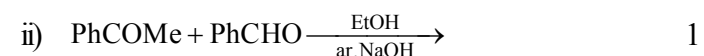
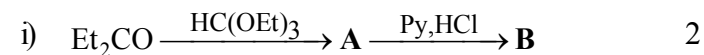
- b) Carry out the following transformations (*any two*): 3×2



[3]



- c) Predict the product(s) : answer question (i) - and **any four** from questions (ii - vi) from the following :

**GROUP - C**

3. a) Justify the use of phenolphthalein ($\text{p}K_{\text{in}} = 9.4$) as an indicator in the titration of benzoic acid ($K_a = 6.3 \times 10^{-5}$) with NaOH. 5

[Turn over