

This question paper contains 2 printed pages]

NA—268—2023

FACULTY OF SCIENCE

B.Sc. (Second Year) (Third Semester) EXAMINATION

NOVEMBER/DECEMBER, 2023

(New Pattern)

INDUSTRIAL CHEMISTRY

Paper—VII

(Chemical Reaction Engg.—II)

(Thursday, 28-12-2023)

Time : 2.00 p.m. to 4.00 p.m.

Time—2 Hours

Maximum Marks—40

N.B. :— (i) Solve all questions.

(ii) Scientific calculator is allowed.

1. At 500 K the rate of biomolecular reaction is ten times the rate at 400 K.

Find the activation energy for this reaction : 15

(a) From Collision theory

(b) From Arrhenius law

(c) What is the % difference in rate of reaction at 600 K predicted by these two methods ?

Or

(a) Give the difference between Elementary and Non-elementary reaction. 7

P.T.O.

- (b) Derive temperature dependency reactions from Arrhenius law. 8
2. From the following data show decomposition of Hydrogen peroxide in aqueous solution is a first order reaction. What is the value of rate constant ? 15

Time	0	10	20	30	40
(Min.)					
N	25	20	15.7	12.5	9.6

where 'N' is the number of ml of KMnO_4 required to decomposition of definite volume H_2O_2 .

Or

- (a) Derive the equation $t = \frac{1}{K} \left[\frac{1}{C_A} - \frac{1}{C_{A_0}} \right]$. 7
- (b) What is n th order ? Derive empirical rate equation of n th order. 8
3. Write short notes on (any two) : 10
- Autocatalytic reaction
 - Molecularity and order of reaction
 - Kinetic models for non-elementary reaction
 - Merits and demerits of Batch reactor.