UG/2nd Sem/INDUS/Major/19

2019

Major

2nd Semester Examination

INDUSTRIAL CHEMISTRY

Paper—C4T

Industrial Aspects of Physical Chemistry

Full Marks : 60   Time : 3 Hours

The figures in the margin indicate full marks.
Candidates are required to give their answers
in their own words as far as practicable.

Group–A

1. Answer any *ten* questions :   10×2

   (a) What do you mean by "Adsorption" ? Give one example.

   (b) Define the term "Colloid" with example.

   (c) What is "homogenious Catalysis" ? Give one example.

   (d) State the Gibbs phase rule.

   (e) Define the term "Auto Catalysis" and explain with an example.

   (f) What do you mean by "Sol-gel" process ? Give an example

[Turn Over]

(g) What are micelles ? Explain with an example.

(h) What is Catalyst promotor ? Write it's importance with an example.

(i) Explain the term "Gibbs Free Energy".

(j) What is meant by activation energy of a reaction ?

(k) Define the term internal energy and enthalpy.

(l) What do you mean by state & path function ?

(m) Explain the term "Intensive & Entensive properties". Give examples.

(n) Write down the differences between order & malecularity of a reaction.

(o) What do you mean by chain reaction ? Explain with an example.

Group–B

Answer any *four* questions :   4×5

2. What is Freundlich Adsorption Isotherm ? Describe how the constants of the isotherm can be evaluated graphically.   2+3

3. Define the term "Gold Number". Write down the characteristics of Lyophilic and Lyophobic sols.   2+3

4. What do you mean by "Associated Colloids"? Draw a picture of soap micelles and discuss its use as cleaning agent.   2+3

5. Draw phase diagram for water system and define the triple point in diagram.   3+2

6. The rate of a chemical reaction doubles for an increase of 10K from 298K. Calculate the activation energy of the reaction.   5

7. Calculate the half life of a 1st order reaction from their rate constants given below :

   (i) 200 s^{-1} (ii) 2 min^{-1} 5

Group–C

8. Answer any *two* questions :   2×10

   (a) Give the reaction mechanism of a homogeneously catalysed reaction and hence prove that the rate of reaction depends on concentration of substrate as well as that of the catalyst.

[Turn Over]

(b) Name some important catalyst which are industrially used.   2+6+2

9. (a) Explain how catalysis depends on surface nature.

(b) Write a note on Aerosols.

(c) Establish the van't Hoff equation.   2+3+5

10. (a) Derive the expression for the rate constant of a 1st order reaction and hence derive the equation for its half life period.   5

(b) Calculate the degree of freedom of the following system. $2\frac{1}{2} \times 2$

     (i) Aqueous solution of H_2SO_4

     (ii) Dissociation of $CaCO_3$ in closed vessel.

11. (a) Draw and describe the phase equilibrium diagram for Sulphur system.

(b) Write a Short note on Enzyme Catalyzed reactions.

                   6+4