

Total No. of Questions :10]

SEAT No. :

[Total No. of Pages :3

**P372**

**[5215] - 31**

**F.Y.B.Sc. (Vocational)**

**INDUSTRIAL CHEMISTRY**

**Surface Chemistry and Catalysis**

**(2013 Pattern) (New) (Paper - I)**

*Time : 3 Hours]*

*[Max. Marks :80*

*Instructions to the candidates:*

- 1) All questions are compulsory.*
- 2) Answers to the two sections should be written in separate answer books.*
- 3) Figures to the right indicate full marks.*
- 4) Draw neat diagrams wherever necessary.*

**SECTION-I**

**Q1)** Define and explain the following terms:

**[8]**

- a) Dialysis.
- b) Sol.
- c) Brownian movement.
- d) Micelles.

**Q2)** Answer any two of the following:

**[8]**

- a) Distinguish between emulsion and gel.
- b) Explain auto catalysis with suitable example.
- c) Write a short note on application of catalysis.

***P.T.O.***

**Q3)** Answer any two of the following: [8]

- a) Explain the term catalytic poisoning.
- b) Explain condensation method for preparation of sol.
- c) State and explain Tyndall effect.

**Q4)** Answer any one of the following: [8]

- a) Define gel and explain it's types. Give it's properties.
- b) What is heterogeneous catalysis and explain it's types with suitable examples.

**Q5)** Answer any two of the following: [8]

- a) Explain intermediate compound formation theory.
- b) Explain the characteristics of catalytic reactions.
- c) Give the ultrafiltration method for purification of sol.

## **SECTION-II**

**Q6)** Answer the following: [8]

- a) Define mole fraction.
- b) Write in SI unit of the following terms:
  - i) Electric charge
  - ii) Frequency
  - iii) Power
  - iv) Electric resistance
- c) State and explain heat capacity.
- d) Define the term 'yield'.

**Q7)** Answer any two of the following: [8]

- Explain the terms steady state and unsteady state operation with suitable examples.
- Give the generalised approach for solving material balance problems involving chemical reaction. Give classification of material balance problem.
- Write a note on recycling and by-passing operations.

**Q8)** Answer any two of the following: [8]

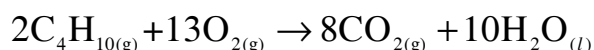
- Give the aspects of process flow sheet.
- Write a short note on material balance in evaporation.
- Write a short note on percent excess.

**Q9)** Answer any one of the following: [8]

- State and explain Raoult's law and Henry's law.
- Explain the enthalpy change for pure substance and for mixture of gases.

**Q10)** Solve any two of the following: [8]

- What is the strength of  $\text{Na}_2\text{CO}_3$  solution in gms/litre. If 10 g of  $\text{Na}_2\text{CO}_3$  is dissolved in 200 ml solution?
- Calculate enthalpy change for the following reaction in which 65 g mole  $\text{CO}_2$  is produced at  $25^\circ\text{C}$ .



Given

Component	$\Delta H_f^\circ$ kcal / g mole
$\text{C}_4\text{H}_{10(g)}$	-30.14
$\text{CO}_{2(g)}$	-94.051
$\text{H}_2\text{O}$	-68.315

- 9.8 g of  $\text{H}_2\text{SO}_4$  is dissolved to make 100 ml of solution. Find the normality and molarity of the solution.

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