Total No. of Questions :10]

SEAT No. : ____

P372

[Total No. of Pages :3

[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]**

a) Explain the terms steady state and unsteady state operation with suitable examples.

b) Give the generalised approach for solving material balance problems involving chemical reaction. Give classification of material balance problem.

c) Write a note on recycling and by-passing operations.

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

a) Give the aspects of process flow sheet.

b) Write a short note on material balance in evaporation.

c) Write a short note on percent excess.

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

a) State and explain Raoult's law and Henry's law.

b) Explain the enthalpy change for pure substance and for mixture of gases.

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

a) What is the strength of $Na_2 CO_3$ solution in gms/litre. If 10 g of Na_2CO_3 is dissolved in 200 ml solution?

b) Calculate enthalpy change for the following reaction in which 65 g mole CO_2 is produced at 25°C.

$$2C_4H_{10(g)} + 13O_{2(g)} \rightarrow 8CO_{2(g)} + 10H_2O_{(l)}$$

Given

Component	ΔH_f° kcal / g mole
$C_4H_{10}(g)$	–30.14
$CO_2(g)$	–94.051
H_2O	–68.315

c) 9.8 g of H_2SO_4 is dissolved to make 100 ml of solution. Find the normality and molarity of the solution.

EEE