Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.Tech (CHE)/SEM-3/CH-313/2009-10

2009
CHEMISTRY

Time Allotted : 3 Hours Full Marks : 70

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
(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following : 10 × 1 = 10

   i) Which of the following is optically inactive ?

   a) Glycine b) Alanine

   c) Lysine d) Phenyl alanine.

   ii) Surface tension of a liquid can be determined by

   a) Ostwald Viscometer

   b) Stalagmometer

   c) Barometer

   d) Stigmomanometer.

iii) Which of the following is disproportionation reaction ?

a) Cannizzaro reaction

b) Aldol reaction

c) Perkin reaction

d) Wittig reaction.

iv) The colour of a colloidal suspension occurs due to

a) Tyndal effect b) Electrokinetic effect

c) Brownian motion d) none of these.

v) Ethyl acetoacetate (EAA) is the product of

a) Knoevenagel condensation

b) Benzoin condensation

c) Aldol condensation

d) none of these.

vi) For a negatively charged sol, the highest coagulating power will be shown by

a) SO_4^{2-} b) Al^{3+}

c) K^+ d) Cl^-.

vii) During dispersion method of preparation of colloids the size of the particles is

a) increased b) made uniform

c) decreased d) not altered.

viii) Mathematical expression of Gibbs adsorption equation is

a) $\tau = -\frac{C}{RT}\frac{\partial C}{\partial \gamma}$ b) $\tau = -\frac{1}{RT}\frac{\partial C}{\partial \gamma}$

c) $\tau = -\frac{C}{RT}\frac{\partial \gamma}{\partial C}$ d) $\tau = -\frac{C}{R}\frac{\partial C}{\partial \gamma}$.

ix) According to the Freundlich adsorption isotherm, value of n should be

a) 0 — 0·5 b) 0·5 — 0·8

c) 0·8 — 0·95 d) > 1·0.

x) With the increase in temperature, surface tension of a liquid

a) increases

b) decreases

c) remains same

d) may increase or decrease.

xi) Which of the following compounds undergoes haloform reaction ?

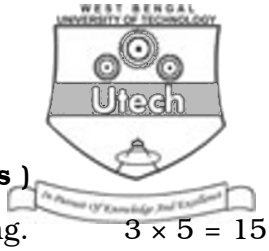
a) isopropanol b) acetaldehyde

c) ethanol d) all of these.

xii) Detection of protein is done by

a) Biuret reaction b) Millon's reaction

c) Ninhydrin test d) all of these.



GROUP – B
(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. Briefly explain the terms Electrodialysis and Electrophoresis. $2 \times 2\frac{1}{2}$

3. Define surface tension. How do you determine surface tension by capillary rise method ? 3 + 2

4. a) Write B.E.T. equation and explain the term in it.

   b) What do you mean by Sedimentation potential ? 3 + 2

5. a) Write the differences between physisorption and chemisorption.

   b) "Inversion of configuration takes place in SN^2 reaction whereas racemisation takes place in SN^1 reaction." Explain. 2 + 3

6. a) Transform

      i) propanoic acid to ethanoic acid

      ii) propanol to 2-propanol.

   b) Explain why hydroxyl group in phenol in orthopara orienting with respect to electrophile. 3 + 2

7. Write notes on any *two* of the following : $2 \times 2\frac{1}{2}$

   a) Ambident nucleophiles

   b) Reducing and non-reducing sugars

   c) Strecker synthesis of amino acid

   d) Mutarotation.

GROUP – C
(Long Answer Type Questions)
Answer any *three* of the following. $3 \times 15 = 45$

8. a) Derive Langmuir adsorption isotherm.

   b) What is gold number ? Explain it.

   c) Define shear viscosity and intrinsic viscosity.

   d) How do you find out the molecular weight of a polymer using intrinsic viscosity ? $4 + 3 + (2 \times 2) + 4$

9. a) Explain why there is a capillary rise for water but capillary depression for mercury.

   b) Explain how stearic acid forms a surface film and write two dimensional equation of state for such a film.

   c) Why does an increase in temperature generally result in decrease in viscosity ? $5 + (6 + 2) + 2$

10. a) Explain what is meant by CMC (critical micellar concentration).

    b) What is meant by zeta potential ?

    c) Explain the origin and charge of colloidal particles.

    d) Depict the flow behaviour (shear stress *vs* shear rate) of

        i) Newtonian

        ii) Shear thinning. $2 + 3 + 5 + 2 \times 2\frac{1}{2}$

11. How would you synthesise the following ? 5×3

    a) An aliphatic ketone via grignard synthesis

    b) Cinnamic acid from ethyl acetoacetate

    c) Adipic acid from diethyl malonate

    d) Succinic acid from ethyl acetoacetate

    e) Tertiary butyl alcohol via grignard synthesis.

12. a) How can the N-terminus and C-terminus of a peptide chain be detected ?

    b) How can Ala-Gly be synthesized ?

c) Starting from methyl magnesim iodide, how will you synthesize propane, propanal ?

d) Predict the product(s) :

5 + 3 + 4 + 3

13. a) How do you prepare Alanine by Gabriel's Phthalimide synthesis method ?

b) What do you mean by primary and secondary structures of protein ?

c) Write a comparison between substitution and elimination reactions giving examples.

d) Give a short note on Claisen ester synthesis.

3 + 4 + 4 + 4