Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.TECH CHE(O)/SEM-3/CH-313/2012-13

2012

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 :

$10 \times 1 = 10$

i) Which product is formed in the reaction of methyl magnesium bromide with ethylene oxide ?

a) $CH_3 CH(OH) CH_2 CH_3$

b) $CH_3 CH_2 CH_2 OH$

c) $(CH_3)_3 C CH_2 OH$

d) $(CH_3)_2 CH CH_2 OH$.

ii) Which Grignard reagent is best suited for the synthesis of 3-methyle-1-butanol from a carbonyl compound ?

a) $CH_3\ CH_2\ CH_2\ MgBr$

b) $(CH_3)_2\ CH\ CH_2\ CH_2\ MgBr$

c) $(CH_3)_2\ CH\ CH_2\ MgBr$

d) $(CH_3)_2\ CH\ MgBr$.

iii) What transformation does Tollen's reagent cause ?

a) Conversion of aldehydes to ketones

b) Reduction of carboxylic acids

c) Oxidation of Ketones

d) Oxidation of aldehydes.

iv) The product of Claisen condensation between two moles of an ester is usually

a) an α-hydroxy ester b) a β-hydroxy ester

c) an α-ketoester d) a β-ketoester.

v) Which of the following is a polysaccharide ?

a) Glucose b) Ribose

c) Sucrose d) Cellulose.

vi) What oxidation can be carried out with bromine water ?

a) Oxidation of terminal – CH_2OH to – wolt

b) Oxidation of terminal – CH_2OH to – CHO

c) Oxidation of ketose to an aldonic acid

d) Oxidation of an aldose to an aldonic acid.

vii) Which functional group forms the peptide bonds of proteins ?

a) Ether b) Ester

c) Amide d) Acetal.

viii) Ninhydrin test is used to

a) detect the presence of aminoacids

b) distinguish the acidic, basic and neutral aminoacids

c) distinguish between *D* and *L* stereosisomers

d) determine the isoelectric point of aminoacids.

ix) Gold number is a measure of

a) protective action by a lyophilic colloid in lyophobic colloid

b) protective action by a lyophobic colloid on lyophilic colloid

c) number of mg of gold in a standard red gold sol

d) stability of the gold sol.

x) Enzymes are

a) carbohydrates b) lipids

c) proteins d) none of these.

xi) According to Langmuir's adsorption isotherm, the amount of gas adsorbed at very high pressure

a) goes on increasing with increasing pressure

b) goes on decreasing with increasing pressure

c) increases at first and decreases later with pressure

d) reaches a constant limiting value.

xii) Which of the following will have the highest coagulating power for AS_2S_3 colloid ?

a) PO_4^{3-} b) Al^{3+}

c) SO_4^{2-} d) Na^{+}.

GROUP – B

(Short Answer Type Questions)

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

2. How would you convert an aldopentose to an aldohexose and vice versa ?

3. a) How would you transform acetic acid to propanoic acid ? 3

   b) Identify [*A*], [*B*], [*C*] and *D* in the following reaction sequence ? 2

   $CH_3CHO \xrightarrow[H_2SO_4]{Na_2Cr_2O_7 +} [A] \xrightarrow{NH_2} [B] \xrightarrow{Br_2 + KOH}$

   $[C] \xrightarrow{HNO_2} [D]$

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

   a) Mutarotation

   b) Cannizaro reaction

   c) Tautomerism

   d) Inversion of canesugar.

5. Explain the following statements :

   a) 'CH_3Br follows SN^2 reaction, whereas $(CH_3)_3CBr$ follows SN^1 reaction.'

   b) 'Nitro group in nitrobenzene is meta orienting with respect to electrophilic substitution.' 3 + 2

6. a) How can the colloids be classified depending upon the solvent affinity ?

   b) Describe double decomposition method for the preparation of lyophobic colloids. 3 + 2

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

7. a) How is ethyl acetoacetate prepared in the laboratory ?

   b) Starting from ethyl acetoacetate, how would you synthesise

      i) acetyl acetone

      ii) adipic acid

      iii) 2-methyl propanoic acid

      iv) cinnamic acid ? 3 + 12

8. a) How would you prove that glucose contains :

      i) a – CHO group

      ii) five – OH groups

      iii) the five – OH groups linked to different carbon atoms ?

   b) Explain why glucose and fructose form the same oxazone.

   c) How would you convert an aldose to a ketose and vice vesa ?

   d) What is meant by epimerisation ? 3 + 4 + 5 + 3

9 a) Write two general methods of preparation of amino acids.

   b) Explain isoelectric point of an amino acid with a suitable example.

   c) What do you understand by the primary and secondary structures of proteins ?

   d) Mention two colour tests for proteins. 5 + 4 + 4 + 2

10. a) How do the dialysis and electrodialysis methods play an important role in purification of colloids ?

    b) Write an informatory note on Newtonian and non-Newtonian fluids.

    c) In the light of surface tension of a spherical drop of liquid derive Laplace equation. 6 + 4 + 5

11. a) Explain in detail the electric double layer theory. 6

    b) Write short notes on any *three* of the following : 3 × 3

        i) Surface film on liquids

        ii) Relative viscosity

        iii) Effect of temperature on surface tension

        iv) Association colloids.