

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.*

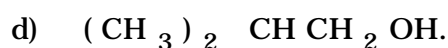
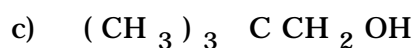
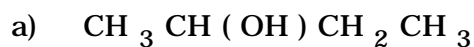
**GROUP - A**

**( Multiple Choice Type Questions )**

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

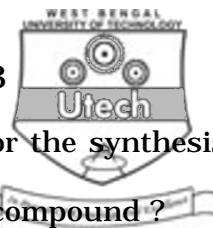
10 × 1 = 10

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



3112(O)

[ Turn over



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

- a)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{MgBr}$
- b)  $(\text{CH}_3)_2\text{CHCH}_2\text{CH}_2\text{MgBr}$
- c)  $(\text{CH}_3)_2\text{CHCH}_2\text{MgBr}$
- d)  $(\text{CH}_3)_2\text{CHMgBr}$ .

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  $\alpha$ -hydroxy ester      b) a  $\beta$ -hydroxy ester
- c) an  $\alpha$ -ketoester          d) a  $\beta$ -ketoester.

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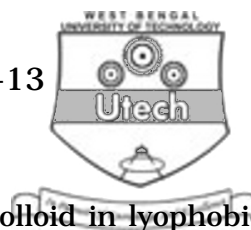
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- ix) Gold number is a measure of
- a) protective action by a lyophilic colloid in lyophobic colloid
  - b) protective action by a lyophobic colloid on lyophilic colloid
  - c) number of mg of gold in a standard red gold sol
  - d) stability of the 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 )**

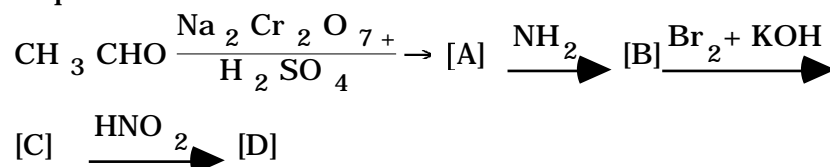
Answer any *three* of the following.

3 × 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



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

- Mutarotation
- Cannizaro reaction
- Tautomerism
- Inversion of canesugar.

5. Explain the following statements :

- 'CH<sub>3</sub>Br follows SN<sup>2</sup> reaction, whereas (CH<sub>3</sub>)<sub>3</sub>CBr follows SN<sup>1</sup> reaction.'
- '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.  $3 \times 15 = 45$

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 versa ?  
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.

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