Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.TECH (BT-N)/SEM-3/CH (BT)-302/2011-12

2011

CHEMISTRY-II

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) Lipid molecules are

a) acidic b) basic

c) alkaline d) amphipathic.

ii) Asymetric Carbon is absent in

a) Alanine b) Arginine

c) Histidine d) Glycine.

iii) Stigmasterol is a

a) lipid b) carbohydrate

c) protein d) vitamin.

iv) Glycogen is a polysaccharide used for energy storage by

a) plant b) monera

c) animal d) fungi.

v) Which of the following is a purine ?

a) Adenine b) Thymine

c) Cytosine d) None of these.

vi) Ultraviolet absorption of proteins above 240 nm is due to

a) Trptophan b) Aspartate

c) Alanine d) Glutamate.

vii) Which of the following is not an example of van der Waals force ?

a) H Bond b) Disulphide bond

c) Covalent bond d) None of these.

viii) All are related except

a) diastereomer b) enantiomer

c) epimer d) *cis*-trans isomer.

ix) Mutarotation is the result of change in formation (glucose) at

a) C1 b) C2

c) C3 d) C4.

x) Which of the following condition does not suit $S_N 2$ reaction ?

a) Less polarity of the solvent

b) highly substituted substrate

c) High nucleophilicity

d) All of these.

xi) The equation relating pH and pKa of a solution is known as

a) Helmoltz equation

b) Henderson equation

c) Gibbs Duhem equation

d) Carnot equation.

xii) The molecules which are mirror image to each other are called

a) diastereoisomer b) mesomer

c) isomer d) enantiomer.

GROUP – B

(Long Answer Type Questions)

Answer *five* questions taking at least *one* from each module.

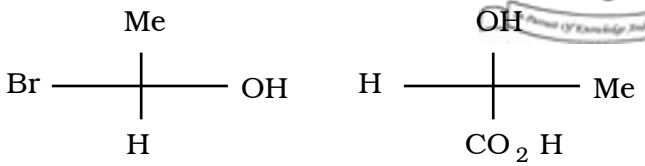
$5 \times 12 = 60$

MODULE – 1

2. a) Derive Lambert-Beer's law. What are the limitations of this law ?

b) Explain the solvent effect on the spectral transition of UV-spectroscopy.

c) Assign R – S nomenclature



3 + 2 + 4 + 3

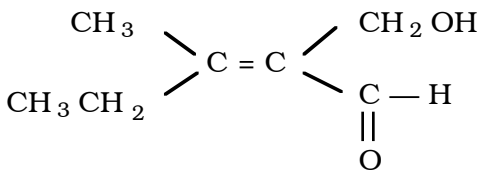
3. a) What do you mean by optical isomerism ?

b) Calculate the pH of Vinegar of concentration 0·667 M. (Ka = 1·8 ∞ 10^{-5}).

c) Write the structrue of *n*-butane in Newton and Sowhorse formula.

d) Determine the R/S configuration of α-D Glucose.

e) Determine the E/Z momenclature of the following molecule :



2 + 3 + 2 + 2 + 3

MODULE – 2

4. a) Give example of PUFA and MUFA What is sphingolipid ?

   b) Write the structure of α-D glucose in Fischer projection and Haworth formulae.

   c) Give a reaction which distinguishes glucose and fructose. 5 + 5 + 2

5. a) Write down the structure of different forms of Vitamin *C*. What are its function in the body and deficiency syndrome ?

   b) Lactose is reducing sugar but sucrose is not. Explain.

   c) Explain why melting of a fat decreases with increase of unsaturation.

   d) What do you understand by cholesterol ?

   5 + 2 + 3 + 2

MODULE – 3

6. a) Draw and explain the titration curve of glutamic acid. The pK_1 , pK_2 an pK_R values of the acid are 2·19, 9·67 and 4·25 respectively.

b) Only histidine among amino acids acts as a buffer at the physiological pH. Explain.

c) State and explain the direction of movement of Lysine in an electric field at pH 5·0. 5 + 4 + 3

7. a) Explain Ramachandran plot. Show the schematic plot right handed and left handed α-helix parallel and anti parallel β-sheet.

b) Explain the denaturation kinetics of DNA. What is the importance of Cot curve. (3 + 4) + (3 + 2)

MODULE – 4

8. a) What are the factors that decide elimination reactions versus substitution reaction ?

b) What is biopolymer ? What do you mean by biocompatibility ? How are nano biomaterials produced ? What are their application ?

3 + 1 + 2 + 3 + 3

9. a) Give short notes on the following :

   i) Saytzeff rule

   ii) Hoffmann rule.

   b) What will be the product when cyclohexanone is treated with hydroxylamine followed by acidification ? What is the name of the reaction ?

   c) What is Kharash effect ? Explain with example.

5 + 4 + 3