

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 answers for any *ten* of the following :

10 × 1 = 10

- i) A carboxylic acid can be converted to its higher homologue via acid chloride by
- a) Arndt-Eistert Synthesis
 - b) Bischler-Napieralski Synthesis
 - c) Claisen-Schmidt Condensation
 - d) Dieckmann Reaction.
- ii) The relationship between the rate of first order reaction and the concentration of the reactant is
- a) directly proportional b) indirectly proportional
 - c) exponential d) Nil.
- iii) The number of essential amino acid is
- a) 7 b) 8
 - c) 9 d) 5.
- iv) Which of the following reactions is chain shortening reaction of carbohydrates ?
- a) Ruff degradation
 - b) Killiani-Fischer synthesis
 - c) Osazone formation reaction
 - d) Karl-Fischer reaction.
- v) The organometallic compound involved in Reformatsky

reaction contains the metal

a) Mg b) Li

c) Zn d) Cd.

vi) α -D- Glucose is different from β -D-Glucose

a) in the configuration at C-1

b) in the configuration at C-2

c) because they are enantiomer

d) because they are geometrical isomers.

vii) The product of Perkin reaction is

a) α,β -unsaturated aldehyde

b) α,β -unsaturated acid

c) α,β -unsaturated alcohol

d) all of these.

viii) Oxidation of glucose with nitric acid gives

a) gluconic acid b) sorbitol

c) osazone d) none of these.

ix) In ClF_5 chlorine atom is

a) sp^3d hybridisation b) sp^3d^2 hybridisation

c) sp^3 hybridisation d) sp^3d^3 hybridisation.

x) Molecularity of a reaction may be

a) zero b) fractional

c) both (a) and (b) d) none of these.

xi) For a reaction catalyst changes

a) activation energy b) free energy change

c) equilibrium constant d) all of these.

xii) The cyclic addition of diene with dienophile on heating

is known as

a) Dakin reaction b) Diels-Alder reaction

c) Dargent reaction d) All of these.

GROUP – B

(Short Answer Type Questions)

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

2. Write on 'Mutarotation of Glucose' with details of the mechanism involved.
3. a) What do you mean by colligative property ? Give example.
- b) State Raoult's law.
- c) How can you show that vapor pressure lowering is a colligative property ?
- d) Name a method to determine lowering of vapor pressure.
4. Write an account on the following : 2×2.5
- i) Meerwin Ponderf Verley Reaction
- ii) Beckmann rearrangement.
5. What is phosphorus ylides ? Write its application to prepare alkene from ketone in Wittig reaction. $2 + 3$
6. What is activation energy of reaction ? Write down the significance of it. State the difference between order and molecularity of reaction. $2 + 1 + 2$
7. Write in detail one method each for step up and step down of an aldose.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

8. Write a short notes on Fischer Indole Synthesis and intramolecular Cannizzaro Reaction. Derive the kinetic equation for First order reaction. What is half life ? What is the half life of first order reaction ? What is activation energy ? What is the difference between order and molecularity ? $2 \times 2.5 + 4 + 1 + 1 + 2 + 2$
9. What do you mean by monosaccharide, disaccharide and polysaccharide ? Give examples for each. Describe the osazone & osone formation of glucose. Illustrate the chain lengthening reaction of glucose. Differentiate among 'starch,

glycogen & cellulose'. 2 + 5 + 5 + 3

10. a) What do you mean by freezing point ? Show that depression of freezing point of a solution is a colligative property. How can it be used to determine the molecular weight of the solute ?

b) What are molal elevation constant and molal depressions constant ?

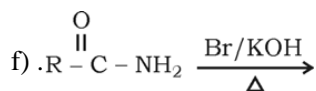
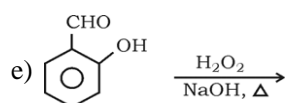
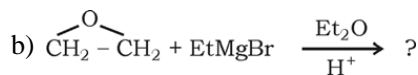
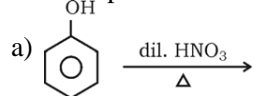
c) What do you mean by isotonic solution & plasmolysis ?

d) Explain why solutions always boil at higher temperature than that of pure solvent. (1 + 6 + 1.5) + 2 + 2 + 2.5

11. What is Michael condensation ? Explain its mechanism. What is Michael retrogression ? Write its importance. What do you mean by active methylene group ? Give one example.

3 + 5 + 2 + 3 + 2

12. Complete the following reactions with explanation : 6 × 2.5



13. Established the equation of second order kinetics. By half value period method how would you determine the order of a reaction. State and write down the Arrhenius equation for temperature dependencies of reaction rate. What is pseudounimolecular reaction ? Give example.