



Name : .....

Roll No. : .....

Invigilator's Signature : .....

**CS/B.Sc.(H)/BT/MOL-BIO/GENETICS/MICRO BIO/SEM-4/CH-401/2012**

**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
- Arndt-Eistert Synthesis
  - Bischler-Napieralski Synthesis
  - Claisen-Schmidt Condensation
  - Dieckmann Reaction.
- ii) The relationship between the rate of first order reaction and the concentration of the reactant is
- directly proportional
  - indirectly proportional
  - exponential
  - 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)  $\alpha$ -D- Glucose is different from  $\beta$ -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)  $\alpha,\beta$ -unsaturated aldehyde
  - b)  $\alpha,\beta$ -unsaturated acid
  - c)  $\alpha,\beta$ -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  $\text{ClF}_5$  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.  $1 + 1 + 2\frac{1}{2} + \frac{1}{2}$
4. Write an account on the following :  $2 \times 2\frac{1}{2}$ 
  - 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 ?  $2 \times 2 \frac{1}{2} + 4 + 1 + 1 + 2 + 2$
9. What do you mean by monosaccharide, disaccharide and polysaccharide ? Give examples for each. Describe the osazone & ozone 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 ?

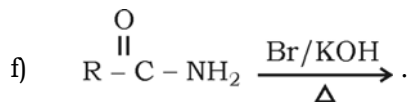
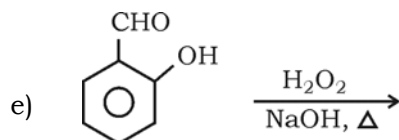
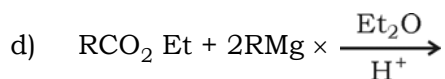
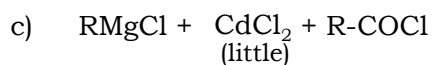
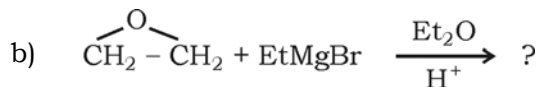
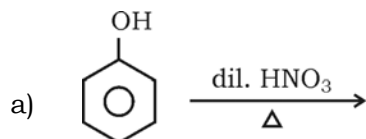


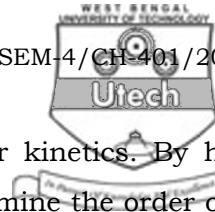
- d) Explain why solutions always boil at higher temperature than that of pure solvent.  $(1 + 6 + 1\frac{1}{2}) + 2 + 2 + 2\frac{1}{2}$

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 :  $6 \times 2\frac{1}{2}$





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 pseudo-unimolecular reaction ? Give example.

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