Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.Sc (H)/BT/GEN/Micro. Bio./Mol. Bio./SEM-2/CH-201/2013

2013
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) Halogenation of alkanes occurs through

      a) Radical

      b) Carbene

      c) Carbocation

      d) Carbanion.

   ii) Hydration of alkenes gives

      a) Aldehyde b) Alcohol

      c) Acid d) Amine.

iii) What is the limiting radius ratio for ZnS type crystals ?

a) 0·225 – 0·414 b) 0·414 – 0·732

c) 0·732 – 0·783 d) none of these.

iv) PV^{γ} = constant for

a) isothermal process

b) adiabatic process

c) reversible process

d) cyclic process.

v) The mathematical expression of 1st law of thermodynamics is

a) $dQ = dE - PdV$ b) $dQ = dE/PdV$

c) $dQ = dE + PdV$ d) $dQ = \Delta E + P\Delta V$.

vi) A salt is soluble in water when the concentration is

a) 0·1 mole/lit. b) 0·2 mole/lit.

c) 0·3 mole/lit. d) 0·5 mole/lit.

vii) The ionic solutes dissolve in

a) non-polar solvent

b) polar solvent

c) ionic solvent

d) organic solvent.

viii) The viscosity of water at 10°C is

a) 1·308 poise b) 1·307 poise

c) 1·306 poise d) 1·305 poise.

ix) At 15°C the viscosity of air is

a) 17·8 Pa-s b) 17·6 Pa-s

c) 17·7 Pa-s d) 17·5 Pa-s.

x) The hybridization of carbon atoms in a benzene ring is

a) sp b) sp^2

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

xi) The bond angle H-O-H bond in water molecule is

a) 109·5° b) 107·3°

c) 105° d) 100°.

xii) Cresols on distillation with zinc dust gives

a) *o*-xylene

b) *o*-xylene and *p*-xylene

c) benzene

d) toluene.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. Write a proper explanatory note on Markownikov and Anti-Markownikov rules.

3. Write down Sulphonation of alkanes with example.

4. Write a short note on radius ratio rule and its limitations.

5. Explain Born-Haber cycle to calculate lattice energy.

6. What is solubility and solubility rule ?

GROUP – C

(Long Answer Type Questions)

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

7. a) Write in detail, about halogenation and nitration of aromatic ring.

   b) Describe Friedel-Craft alkylation and acylation.

   c) What is aromatic electrophilic substitution ?

(3 + 3) + 5 + 4

8. a) Define polymerization.

b) Write down the various reaction of alkenes.

c) Describe the stability of alkanes.

d) What is Ozonolysis ? Write about hydration on alkynes.

2 + 4 + 4 + (2 + 3)

9. a) Write down a short note on solubility of ionic compound in water.

b) Write down a short note on different types of factor of solubility. 6 + 9

10. a) Write down a short note on solution intermolecular forces.

b) Describe the solubility according to the polarity. 10 + 5

11. Define electron affinity, ionization potential and lattice energy. Describe the VSEPR theory and explain the molecular shape of SO_2 and SO_3. Give an account on hydrogen bonding and its effect on physical and chemical properties. 3 + 7 + 5

12. What happens when (answer Question No. (v) and any *six* from the rest) 3 + (2 × 6)

i) Ethereal solution of methyl bromide and ethyl bromide are treated with sodium ?

ii) Acetylene is passed through a heated tube ?

iii) *n*-butane is heated with aluminium chloride at 300°C in presence of trace amount of water and alkene ?

iv) Isobutene glycol oxidizes by acid dichromate or acid permanganate ?

v) 1,2,3-tribromopropane is heated with solid potassium hydroxide and the resulting compound is treated with zinc dust in methanol solution ?

vi) Acetylene is passed into methanol at 160°C-200°C in presence of small amount of potassium methoxide under pressure ?

vii) Mixture of sodium salt of propionic acid and sodalime are heated ?

viii) Butadiene is treated with bromine (one molecule) ?