B.Sc. II Semester Degree Examination, May 2013
Paper – 2 : CHEMISTRY

Time : 3 Hours
Max. Marks: 80

Instructions : 1) *Question paper has* **four** *Sections.* **All** *Sections are* **compulsory.**
2) *Answer for* **all** *Sections should be written in the* **same** *answer book.*

SECTION – A

(Inorganic, Organic and Physical)

1. Answer **any ten** of the following :   (10×2=20)

   a) What is the colour imparted by sodium and rubidium salts when they are exposed to Bunsen flame ?

   b) Which is the only alkali metal which reacts with nitrogen and what is the name of the compound formed ?

   c) How is plaster of Paris prepared ?

   d) Write the electronic configuration of Gallium.

   e) What are pseudohalogens ?

   f) Write the structure and IUPAC name of a saturated compound having molecular formula C_5H_{10}.

   g) Calculate the angle strain in cyclopropane.

   h) Explain Huckel's rule taking anthracene an example.

   i) Give one example for side chain oxidation reaction of a substituted benzene.

   j) How is nitrobenzene prepared from arylamine ?

   k) What are the conditions for the validity of Nernst distribution law ?

   l) Write the different types of binary liquid solutions with examples.

   m) State Raoult's law of vapour pressure.

   n) Calculate the degrees of freedom of one component system at the triple point.

   o) Write the phase rule for two component system.

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SECTION – B

(Inorganic)

2. Answer **any two** of the following :　　　　　　　　　　　　　(2×4=8)

a) What is the action of air and water on alkali metals ?

b) Compare and explain the following properties of alkaline earth metals.

　　i) Flame colouration

　　ii) Hydration energy

c) Explain the diagonal relationship between Boron and Silicon.

3. Answer **any two** of the following :　　　　　　　　　　　　　(2×6=12)

a) Discuss the properties of alkali metals with respect to softness, density and electronegative character.

b) Explain the properties of carbonates, bicarbonates and sulphate compounds of alkaline earth metals.

c) Give an account of borazole.

SECTION – C

(Organic)

4. Answer **any two** of the following :　　　　　　　　　　　　　(2×4=8)

a) Discuss Sachse-Mohr's theory of strainless rings.

b) Write the mechanism of nitration of benzene.

c) Explain one electrophilic and one nucleophilic substitution reactions of nitrobenzene.

5. Answer **any two** of the following :　　　　　　　　　　　　　(2×6=12)

a) i) Give the synthesis of cycloalkanes by Dieckmann's method.

　　ii) How does cyclobutane reacts with H_2/Ni and Br_2/uv light.

b) Explain the reduction reactions of nitrobenzene in acid, alkali and neutral mediums.

c) Give an account of activating and deactivating substituents with examples.

SECTION – D
(Physical)

6. Answer **any two** of the following : (2×4=8)

   a) State and derive Nernst distribution law.

   b) Explain the critical solution temperature with respect to phenol-water system.

   c) Define phase rule and explain the terms involved in it.

7. Answer **any two** of the following : (2×6=12)

   a) i) Derive an expression for distribution law when molecules undergo dissociation.

   ii) The distribution coefficient of A for benzene and water is 10. Calculate the quantity of A extracted from 100 ml of an aqueous solution in which 1 gram of solute is present, by using 100 ml of benzene in one instalment.

   b) What are azeotropic mixtures ? Explain the principle of fractional distillation of binary liquid solutions of type-III.

   c) i) Discuss the application of phase rule to KI-water system.

   ii) What are freezing mixtures ?