(i) Printed Pages: 4 Roll No. .....

(ii) Questions : 7 Sub. Code : 1 1 7 5 8

Exam. Code : 5 0 1 2

Bachelor of Science (FYUP) 2nd Semester

(2055)

CHEMISTRY

Time Allowed : Three Hours] **[Maximum Marks : 60**

Note :— Attempt **FOUR** questions in all, selecting **ONE** question each from Units I—III, and Question No. 1 is compulsory.

(Compulsory Question)

1. (a) What are Keesom forces ?

(b) Draw the structure of NH_3 giving its hybridization.

(c) Why neopentane has lowest boiling point and highest melting point amongst other isomers of pentane ?

(d) What is metamerism ?

(e) What is the effect of temperature on Maxwell's distribution of molecular speeds ?

(f) What is the criteria for thermodynamic equilibrium ?

2×6

UNIT—I

2. (a) Explain the structures of ClF_3 and SF_4 using VSEPR theory.

   (b) Discuss linear combination of atomic orbitals.

   (c) Draw the molecular orbital energy level diagram of CO. Calculate its bond order.

   (d) Calculate percentage ionic character of XY molecule if dipole moment of XY is 2.3D and bond distance is 1.5Å.

   4,4,4,4

3. (a) Discuss Fajan rules.

   (b) Differentiate between Schottky and Frankel defects.

   (c) Calculate radius ratio for a trigonal site.

   (d) What is hydrogen bonding ? Discuss two examples.

   4,4,4,4

UNIT—II

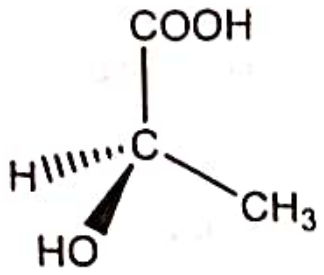
4. (a) Write a note on the sulphonation of alkanes giving important points.

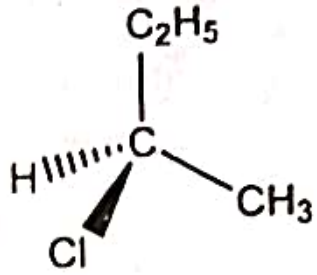
   (b) Discuss Kolbe's reaction.

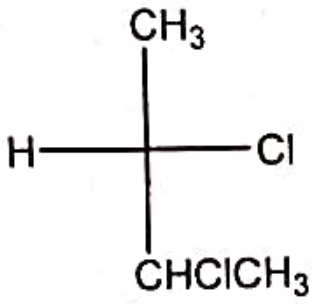
   (c) Give evidences in support of free radical mechanism of halogenation of alkanes.

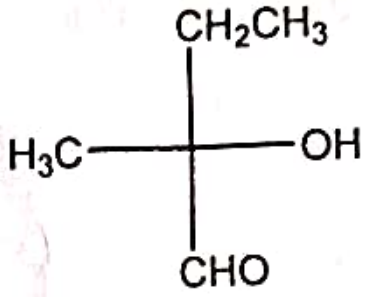
   (d) Discus isomerization reactions of alkanes. 4,4,4,4

5. (a) Assign R and S configurations to the following :

(i) 

(ii) 

(iii) 

(iv) 

(b) What are threo, erythro and meso isomers ? Give suitable examples.

(c) Draw the flying wedge formulae of 3-chloro-2-butanol.

(d) What is specific rotation ? How is it measured ?

4,4,4,4

UNIT—III

6. (a) Deduce Boyle's law from kinetic theory of gases.

(b) Differentiate between ideal and non-ideal gases.

(c) Write a note on experimental determination of critical constants.

(d) Discuss Joule Thomson effect. 4,4,4,4

7. (a) Derive an expression for pressure-volume work done in compression and expansion.

(b) What is heat capacity ? Derive expression for heat capacity at constant volume.

(c) Derive expression for work done for reversible isothermal expansion of an ideal gas.

(d) Write a note on adiabatic expansion of a real gas.

4,4,4,4