

[This question paper contains 6 printed pages.]

Your Roll No.,.....

No. of Question Paper : 5043

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Question Paper Code : 217161

Name of the Paper : CHPT-101 : CHEMISTRY – I

Name of the Course : B.Sc. (Prog.) Physical Sci. / Life
Sci. / Applied Sci.

Semester : I

Duration : 3 Hours

Maximum Marks : 75

Instructions for Candidates

Write your Roll No. on the top immediately on receipt of this question paper.

Attempt any **Three** questions from **Section-A** and **Section-B** respectively.

SECTION – A

- Write the Schrodinger's wave equation. Explain the terms involved in it.
- Plot the radial distribution curves for 3p, 3d orbitals.
- Why half-filled and fully filled orbital systems are more stable?

P.T.O.

(d) Write the values of three quantum number's (n, l, m) for electron in 4f and 3d orbitals. (2,2)

(e) Draw the shape of d orbitals. Indicating the wave function. (2,2)

2. (a) BeCl_2 has zero dipole moment while H_2S has value.

(b) Write Born lande's equation for calculating energy. Explain all the terms in it.

(c) Calculate the % ionic character of Si-H bond in Pauling electronegativity of Si and H are 1.4 and 2.1 respectively.

(d) Discuss the lattice energy.

(e) Which cation will exert a greater polarizing power in the following cases? Explain.

(i) Na^+ or Mg^{2+} (ii) Cu^{2+} or Ca^{2+} (2½,2½)

3. (a) Discuss the hybridization of the central atom and geometry of the following molecules/ions.



(b) Draw the resonance structure of CO_3^{2-} .

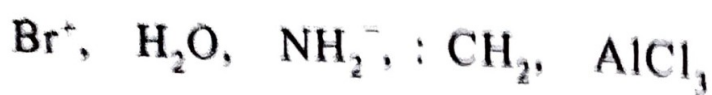
- (c) State the fundamental rules of VSEPR theory.
- (d) Explain the diamagnetic behaviour of N_2 molecule with the help of M.O. diagram. (4,2½,3,3)
- (a) Explain the Born Haber Cycle with suitable example. (3½)
- (b) Write short notes on any **three** of the following :
- (i) Hybridization
 - (ii) Fajan's Rule
 - (iii) Dipole moment
 - (iv) Solvation energy
- (3,3,3)

SECTION - B

- (a) Explain the following :
- (i) Benzyl free radical is more stable than methyl free radical.
 - (ii) Boat conformation of cyclohexane is less stable than chair conformation of cyclohexane.

(iii) Ethylamine is more basic than aniline.

(b) Classify the following as electrophiles and nucleophiles.

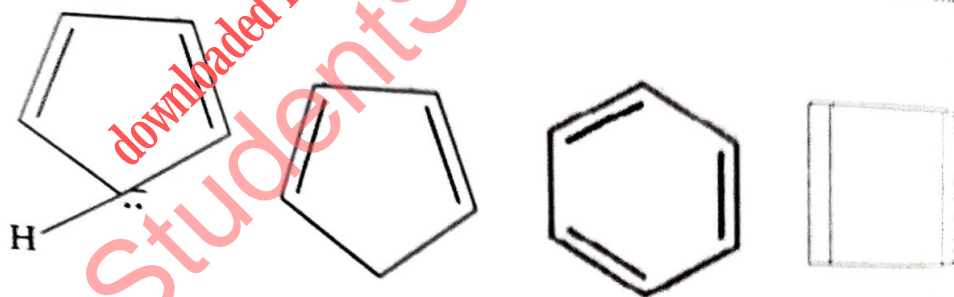


(c) How many stereoisomers are possible for 2,3-dibromobutane? Write their structures and give their relationship with each other.

(6.2)

6. (a) Give a chemical test to distinguish between but-1-yne and but-2-yne.

(b) Explain which of the following are aromatic in nature.

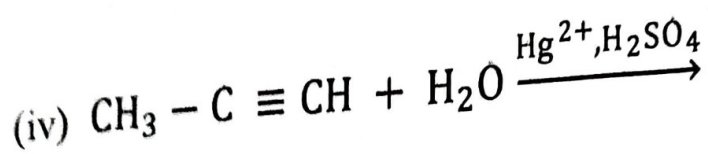
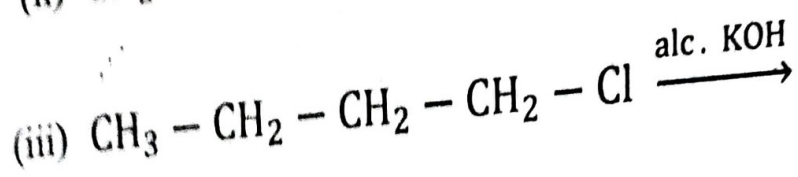
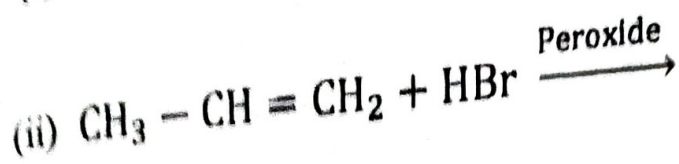
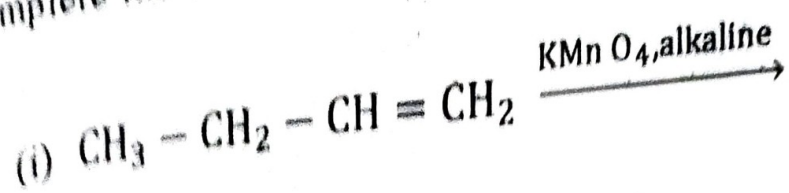


(c) Draw Newmann projection for different conformations of n-butane. Which of the conformation is most stable and why?

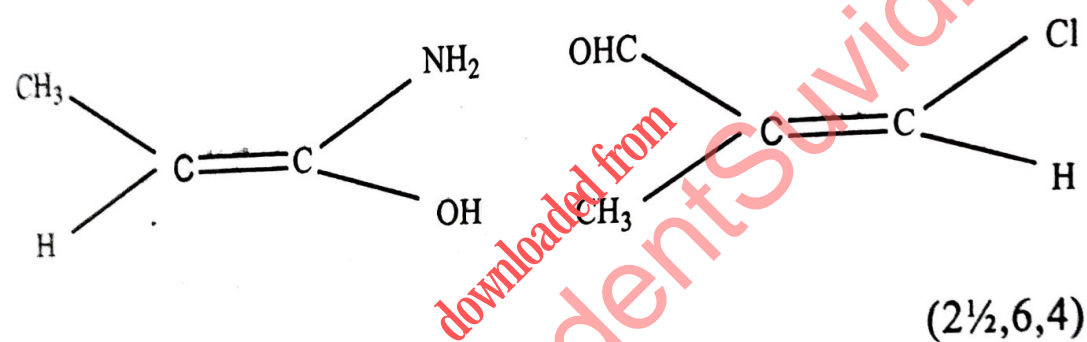
(1.5)

7. (a) Methane and chlorine react in presence of light to form chloromethane. Give mechanism for this reaction.

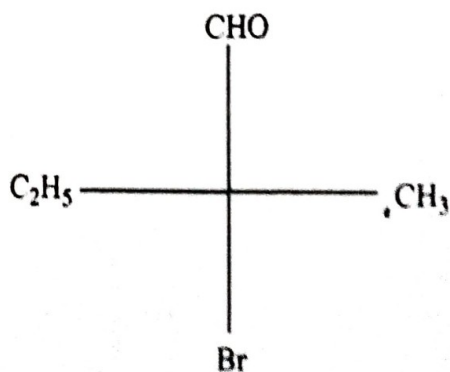
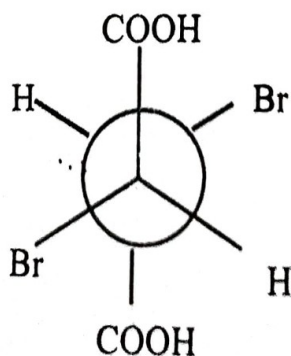
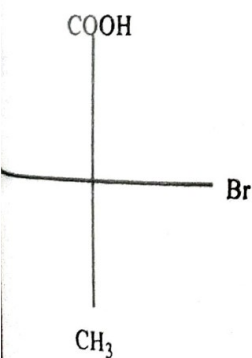
(b) Complete the following reactions :



(c) Giving priority, assign E-/ Z- to the following :



(a) Assign R-/S- configuration to each of the following :



(b) Write short notes on any **two** of the following:

- (i) Wurtz reaction
- (ii) Ozonolysis of alkenes
- (iii) Geometrical isomerism

(c) Differentiate between meso compound and racemic mixture.

(6.5)

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