To be filled in your Answer Book.

PAPER ID : 29908 Roll No.

B. Tech. Examination 2021-22

(Even Semester)

CHEMISTRY

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

Note :– Attempt all questions.

SECTION–A

1. Attempt all parts of the following :   8×1=8

    (a) Why does He_2 not exist?

    (b) Define asymmetric carbon atom.

    (c) In the hydrolysis of sucrose, what will be the order and molecularity of reaction?

    (d) Define racemic mixture.
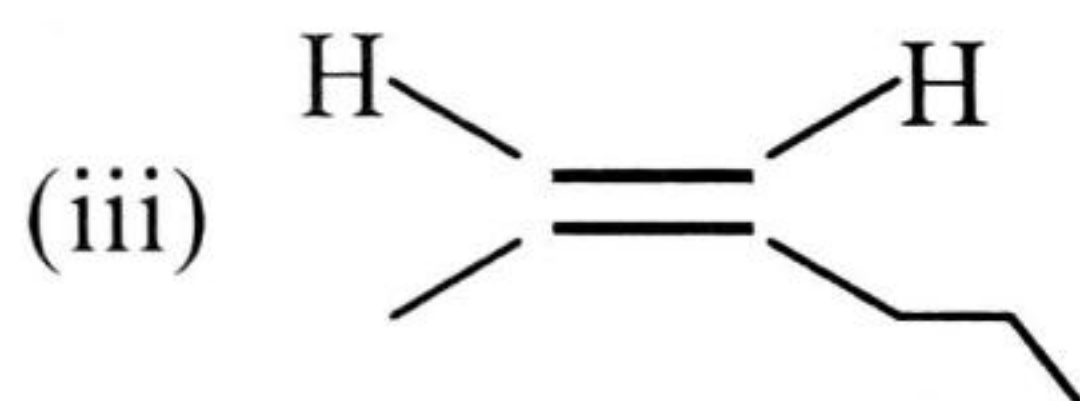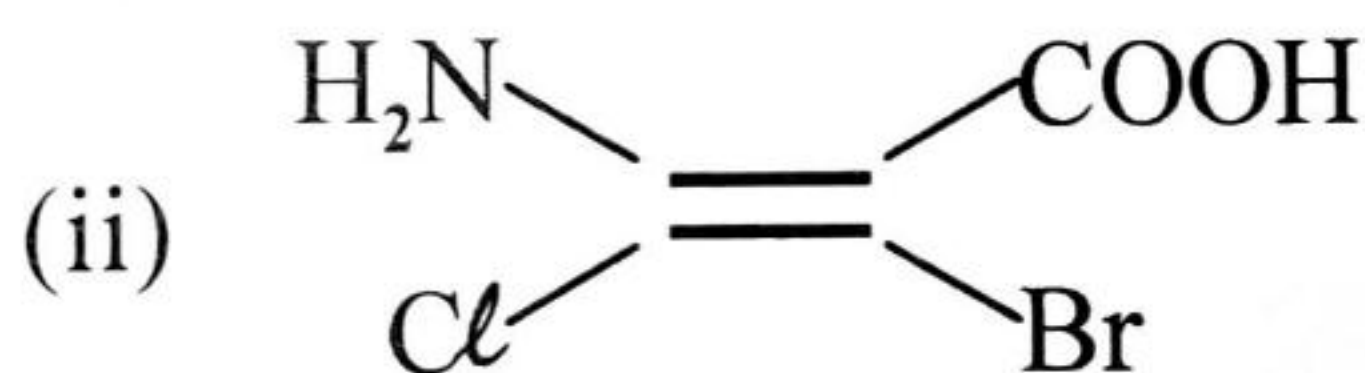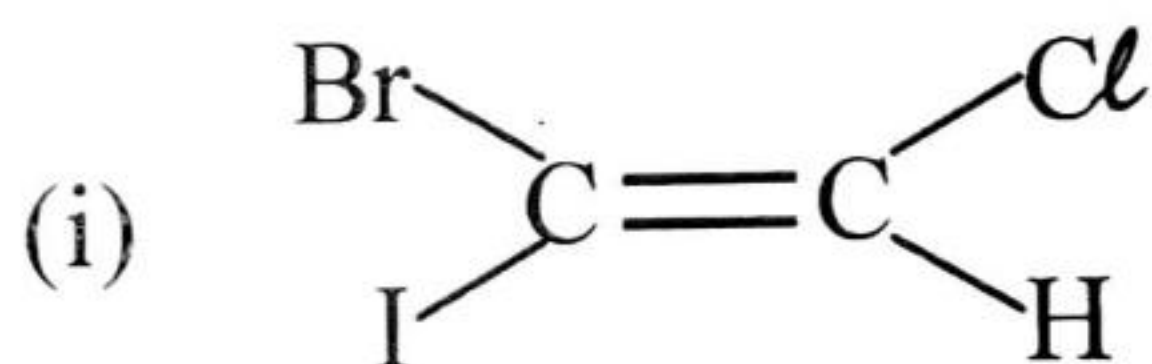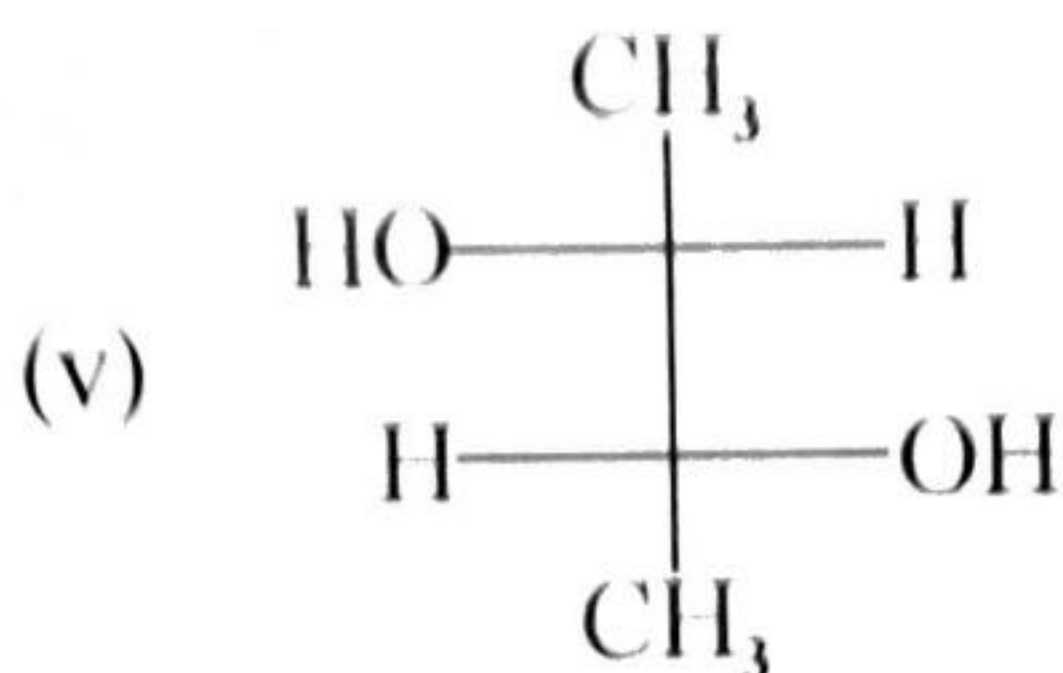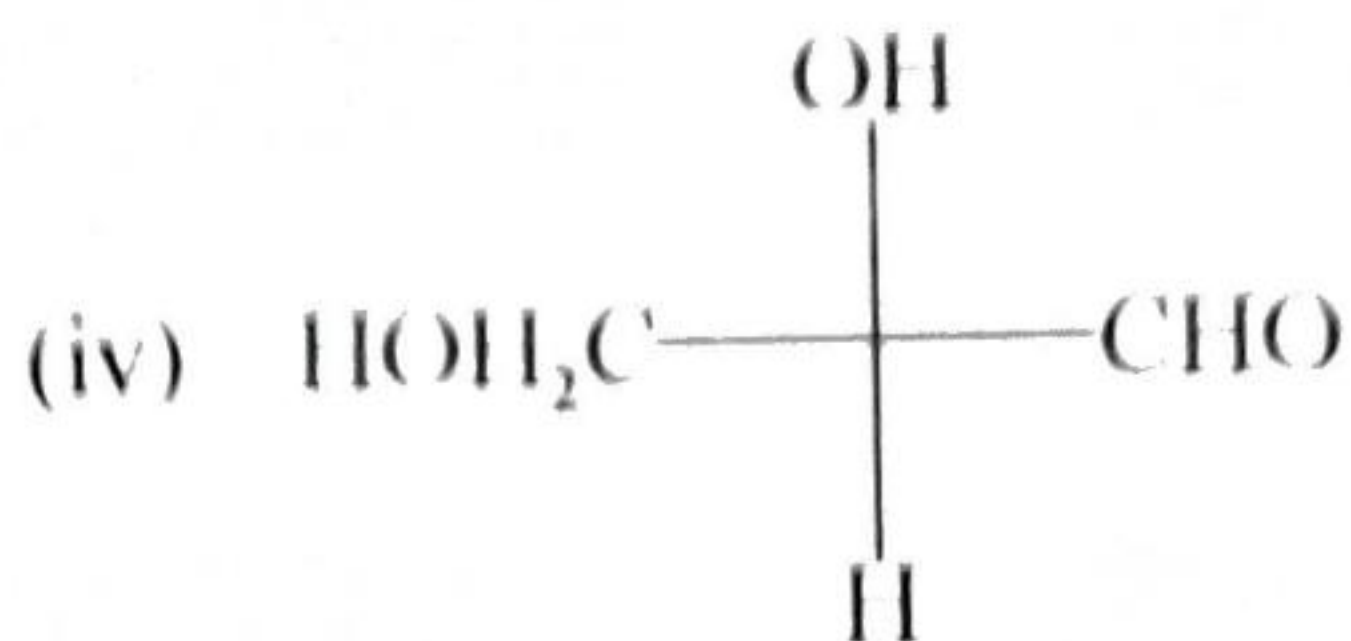
    (e) Write the monomers of Nylon-6, 6.

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(f) What are homopolymers and copolymers?

(g) Write the constituents responsible for permanent hardness of water.

(h) Define conducting polymer giving example.

SECTION – B

2. Attempt any two parts of the following : $2 \times 6 = 12$

(a) What is meant by molecularity of a reaction? Derive the rate equation for a second order reaction when both the reactants are same.

(b) Assign E/Z and R/S configuration to the following :

(i)

$$\underset{I}{\overset{Br}{\diagdown}} C = C \overset{Cl}{\underset{H}{\diagup}}$$

(ii)

$$\underset{Cl}{\overset{H_2N}{\diagdown}} = \overset{COOH}{\underset{Br}{\diagup}}$$

(iii)

$$\underset{}{\overset{H}{\diagdown}} = \overset{H}{\underset{}{\diagup}}$$

(iv) HOH_2C —
$$\underset{\underset{H}{|}}{\overset{\overset{OH}{|}}{C}}$$
— CHO

(v)
$$\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{\underset{H-\!\!\!\!-\!\!\!\!-OH}{HO-\!\!\!\!-\!\!\!\!-H}}}$$

(c)   Define shielding and deshielding of proton in NMR spectroscopy.

Predict the number of signals in the following compounds :

(i) $CH_3 - \overset{\overset{O}{\|}}{C} - CH_3$

(ii) $CH_3 - CH_2 - OH$
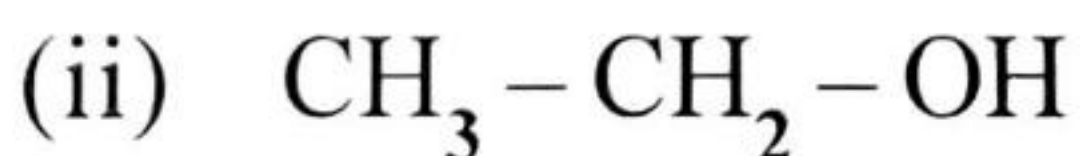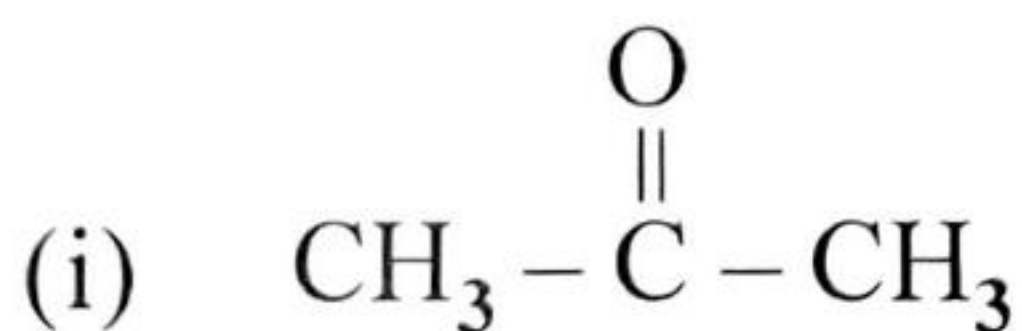
(d)   Give the preparation and uses of BUNA-S and Dacron.

SECTION – C

Note :–   Attempt all questions. Attempt any two parts from each questions. $5 \times 8 = 40$

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3. (a) Write down the postulates of molecular orbital theory. With the help of molecular orbital diagram calculate the bond order of NO molecule and write down its magnetic behaviour.

(b) Derive an expression for the density of a cubic crystal. A metal (atomic mass = 50) has a bcc crystal structure. The density of the metal is 5.96 gm/cm^3. Find the volume of its unit cell.

(c) Define liquid crystal. Discuss in detail about its classification and uses.

4. (a) What is optical activity? Write the stereo isomers of tartaric acid.

(b) Define substitution reaction. Explain the mechanism of SN2 reaction.

(c) Write short notes on the following :

(i) Conformations of n-butane

(ii) Structure and stability of carbocation

5. (a) What are Chromophore and Auxochrome? Explain how do auxochrome increases colouring power of chromophore?

(b) What is volumetric analysis? Explain the terms :

(i) Acid base titration

(ii) Indicator

(iii) End point

(c) With the help of a suitable diagram explain zeolite process of water softening. How is exhausted zeolite regenerated?

6. (a) Classify the polymers on the basis of their origin, method of synthesis and action of heat.

(b) Discuss in detail about the classification and importance of conducting polymers. Write their applications.

(c) Write short notes on the following :

(i) Vulcanization of rubber

(ii) Preparation and uses of neoprene

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