

( 4 )

- (d) Electrical conductivity of an aqueous solution of boric acid increases more when active butane-2,3-diol is added than in case of the meso isomer. Suggest a reason for this observation. 2
- (e) Optical rotation of a solution of strength 30% (w/v) prepared from a mixture of two enantiomers was found to be  $+7.5^\circ$  when measured in a 5 cm long polarimeter tube. If the specific rotation of one enantiomer is  $-60^\circ$ , find out the ratio of the enantiomers in the above mentioned mixture. 2
- (f) Write down the flying-wedge representation of 2R, 3S-2,3-dibromobutane. 1

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Ex/SC/CHEM/UG/CORE/TH/02/2025 (OLD)

**B. SC. CHEMISTRY EXAMINATION, 2025**

**(1st Semester, OLD)**

**CHEMISTRY (CORE)**

**PAPER : CORE/CHEM/TH/02**

*Time : Two Hours*

*Full Marks : 40*

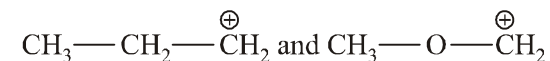
*( 20 marks for each Unit )*

*Use a separate Answer Script for each Unit.*

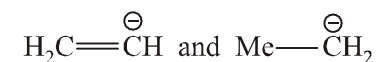
**UNIT—1021-O**

**1. Answer any five of the following : 2×5=10**

- (a) Calculate the Double Bond Equivalent (DBE) of the compound of molecular formula  $C_{13}H_{12}BrNO$ .
- (b) Draw the orbital diagram of  $CH_2=C=CH_2$  and mention the state of hybridization of all the carbon atoms.
- (c) Which of the following carbocations is more stable and why?



- (d) Which of the following carbanions is more stable? Give reason.

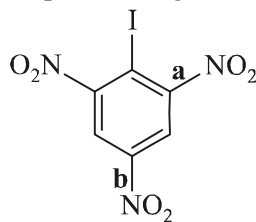


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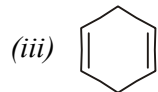
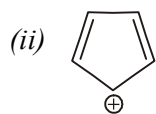
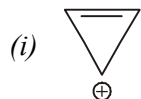
- (e) Compare the melting point of *cis*-2-butene and *trans*-2-butene.
- (f) Why does *n*-butane have higher boiling point than *iso*-butane?

2. Answer **all** questions :

- (a) Compare the C — N bond lengths, **a** and **b** of the following compound and give reason. 3



- (b) Classify the following as aromatic, nonaromatic and anti aromatic. Give reason. 3



- (c) Draw the  $\pi$ -MO diagram of ethylene and indicate HOMO and LUMO energy levels. 2
- (d) Define the term 'pericyclic reaction' and give an example. 2

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[ Continued ]

( 3 )

UNIT—1022-O

3. (a) Give an example of a molecule having an alternating axis of symmetry and pictorially depict its location. 1½

- (b) Find out the symmetry elements present in the following molecules : 2+2+2

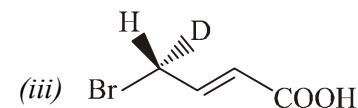
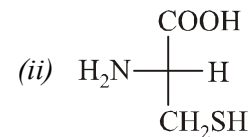
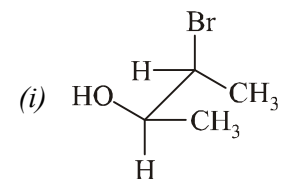
(i) 1,3,5-tribromobenzene

(ii) Iodoform

(iii) *cis*-2-butene

- (c) Assign the configurational descriptor(s) [*R/S* or *E/Z*] whichever applicable to the following molecules indicating relative priority of the substituents.

(1½+1½)+1½+(1½+1½)



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[ Turn Over ]