

## U.G. 2nd Semester Examination - 2022

### CHEMISTRY

[HONOURS]

Course Code : BCEMCCHC 202

Course Title: Organic Chemistry II

Full Marks : 30

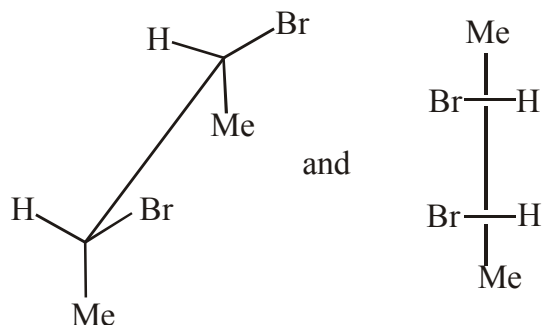
Time : 2 Hours

*The figures in the right-hand margin indicate marks.*

*Candidates are required to give their answers in their own words as far as practicable.*

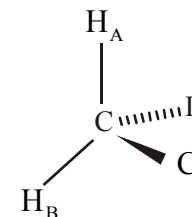
1. Answer any **ten** questions: 1×10=10

- a) Label the following as homomer, enantiomer or diastereomer

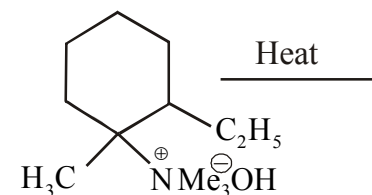


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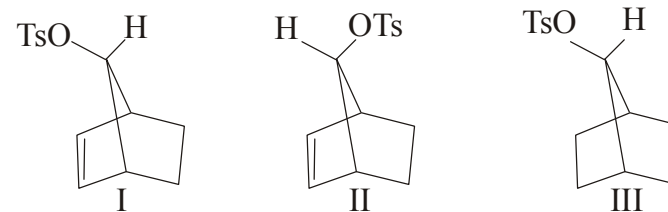
- b) Identify Pro-R and Pro-S group (marked) in the following compound



- c) Give an example of nitro-aci tautomerism.  
d) Indicate major product of the following reaction

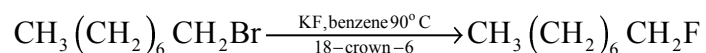


- e) Give an example of a molecule having pseudoasymmetric centre.  
f) Arrange the following compounds in order of increasing rate of solvolysis in acetic acid medium



g) Draw an energy profile diagram for a three step reaction in which first step is slowest and last step is fastest (Assume that reaction is exothermic).

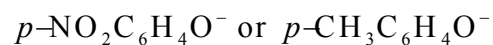
h) What is the role of 18-crown-6 in the following reaction



i) Write true or false against the following statement:

"Except formaldehyde all common aldehyde having general formula R-CHO contains enantiotopic faces".

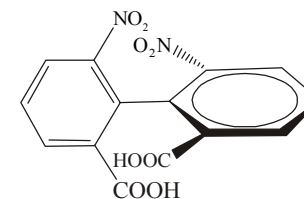
j) Which reagent in the following pair would be more nucleophilic towards  $\text{CH}_3\text{Br}$  in ethanol?



k) Draw the most stable conformer of 1, 3 butadiene.

l) Give an example of a proton sponge.

m) Designate the following compound as  $R_a/S_a$



n) Draw an energy profile diagram of an E2 elimination reaction?

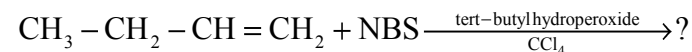
o) Write down the structure of all possible tautomers of acetylacetone.

2. Answer any **five** questions: 2×5=10

a) Draw the potential energy diagram of n-butane for rotation around  $\text{C}_2\text{-C}_3$  bond showing the conformers. Mention the relative stabilities of the conformers.

b) How can the E1cB pathway be distinguished from the kinetically indistinguishable E2 pathway?

c) Predict the products of the following reaction and give suitable mechanism:

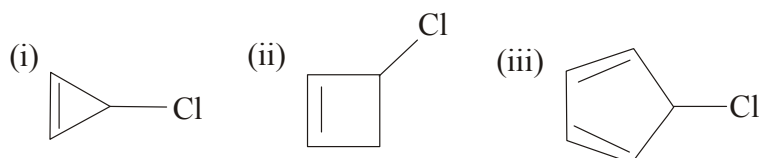


d) Why are vinylic and aryl halides unreactive in  $\text{S}_\text{N}1$  or  $\text{S}_\text{N}2$  reactions?

e) Among 2, 4, 6-trinitro-N, N-dimethylaniline

and 2, 4, 6-trinitroaniline, which one is more basic and why?

f) Arrange the following compounds in order of increasing  $S_N1$  reactivity.



g) What is meant by secondary kinetic isotope effect? Give one example.

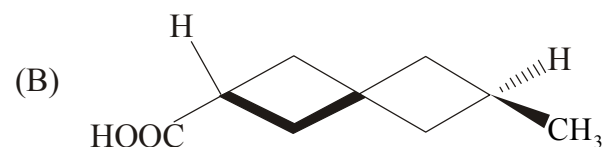
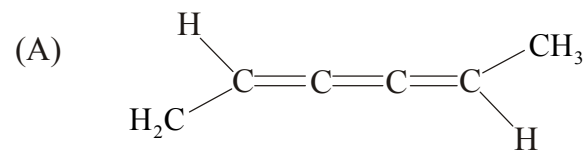
h) Stillbene has two diastereoisomers, one having homotopic faces and other enantiotopic faces. Write down the diastereoisomers and identify the enantiotopic and homotopic faces.

3. Answer any **two** questions:  $5 \times 2 = 10$

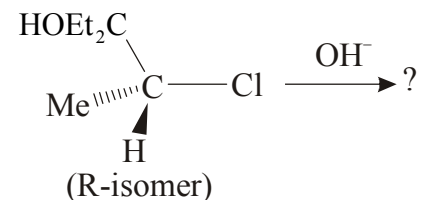
a) i) Define Buttrressing effect. Give an example. 2

ii) Draw the +ac conformation of n-butane, when the molecule is rotated about  $C_2-C_3$  bond axis. 1

iii) Assign the following molecules as chiral/achiral. 2



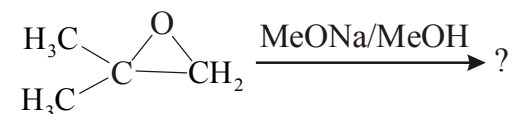
b) i) Complete the following reaction



ii) Iodide catalysed debromination of (2R, 3S)-2, 3- Dibromo-2, 3- dideuteriobutane gives an alkene. Write the stereochemical structure of alkene showing mechanism of the reaction.

2+3

c) i) Predict the product/products of the following reaction:



- ii) Alkyl halides produce mainly cyanides with aqueous ethanolic KCN, whereas with AgCN isocyanides are the main products. Explain
- iii) Compound 'X' is racemised in presence of acid or base. Explain.

