



বিদ্যাসাগর বিশ্ববিদ্যালয়
VIDYASAGAR UNIVERSITY

Question Paper

B.Sc. Honours Examinations 2022

(Under CBCS Pattern)

Semester - II

Subject: CHEMISTRY

Paper: C 4 - T

Organic Chemistry - II

Full Marks : 40

Time : 2 Hours

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

The figures in the margin indicate full marks.

Group - A

Answer any *four* questions.

5×4=20

- (a) What do you mean by “buttressing effect”? 2

(b) Why is the enol content of a cyclic-1, 2-diketone more compared to an acyclic 1, 2-diketone? 2

(c) What is valence tautomerism? Give example. 1
- (a) Compare the acidities of *p*-chlorophenol and *p*-fluorophenol. 2

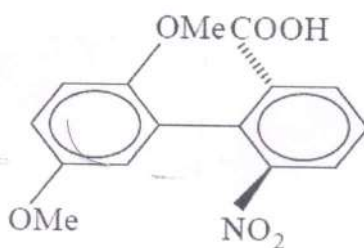
(b) What is primary kinetic isotope effect? Give an example. 2

(c) Triphenylamine is not at all basic in nature. Explain. 1

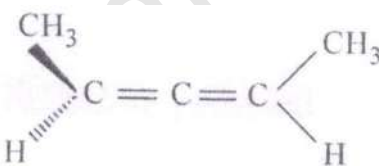
3. (a) Which one is a better nucleophile? ^-OH or ^-OOH ? Explain. 2
- (b) Vinyl halides are very unreactive towards nucleophiles. Explain. 2
- (c) Which of the following reactions is / are stereospecific? 2

S_N1 , S_N2 , E^1 , E^2 1

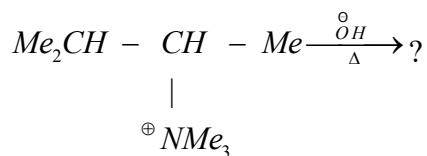
4. (a) Write the most stable conformation of (i) 1, 2-difluoro ethane (ii) 1, 2-ethanediol. 2
- (b) Define Atropisomerism with suitable example. 2
- (c) Designate R/S in the following compound showing the priority of ligands. 1



5. (a) Indicate the elements of symmetry and point group in the given compound. 2

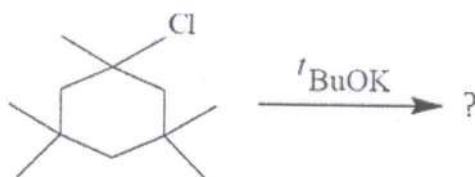


- (b) Write down the products obtained in the following reaction : 2



- (c) Represent 2-butenic acid in *Re-Re* face. 1

6. (a) Write down the major product of the following reaction : 2



(b) What is α -elimination? Give example. 2

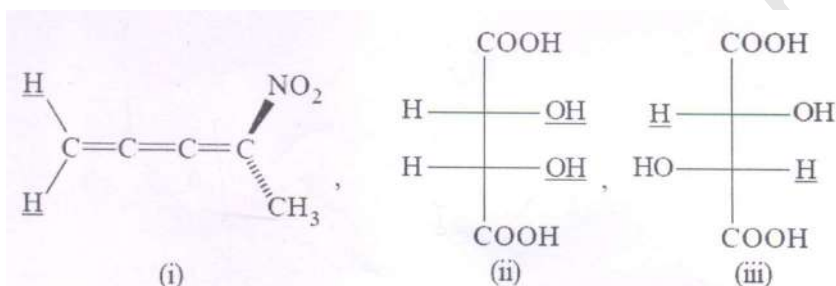
(c) Give an example of ring-chain tautomerism. 1

Group - B

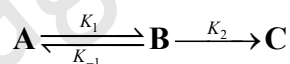
Answer any *two* questions. 10×2=20

7. (a) Draw the staggered conformation of 1-chlorobutane for rotation about C-1/C-2 bond and also about C-2/C-3 bond. Comment on the relative stabilities of the conformers. 3

(b) Identify the underlined atoms and groups as homotopic, enantiotopic or diastereotopic with explanation. 3



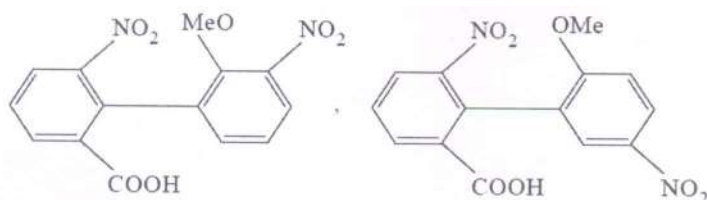
(c) Consider the following reaction sequence :



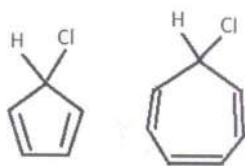
“C” has lower free energy than “A” and $K_2 \gg K_{-1} \gg K_1$.

Draw an energy profile diagram indicating transition states and rate determining step. 2

(d) Compare the ease of racemisation of the following compounds with proper justification. 2



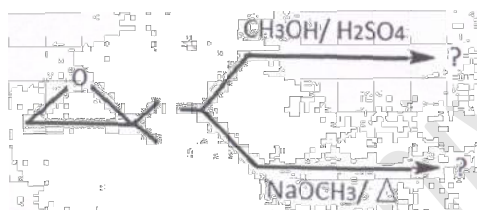
8. (a) Which of the following compounds will be more readily hydrolyzed by aqueous silver nitrate solution? Why?



3

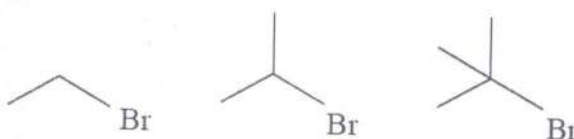
- (b) What happens when (R)-2-chloro butanoic acid is treated separately with dilute *KOH* solution and concentrated *KOH* solution? 4

- (c) Predict the products with mechanistic explanation :



3

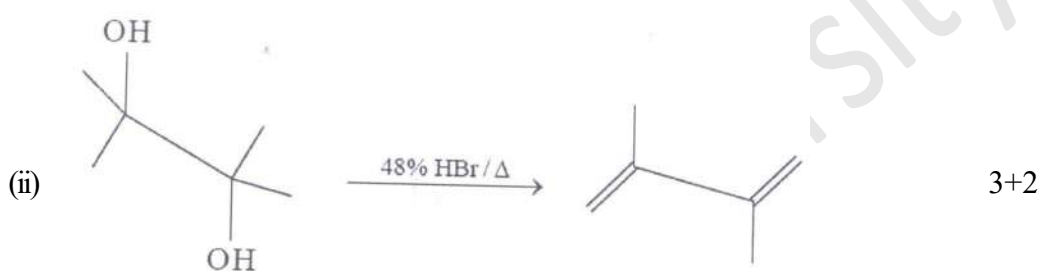
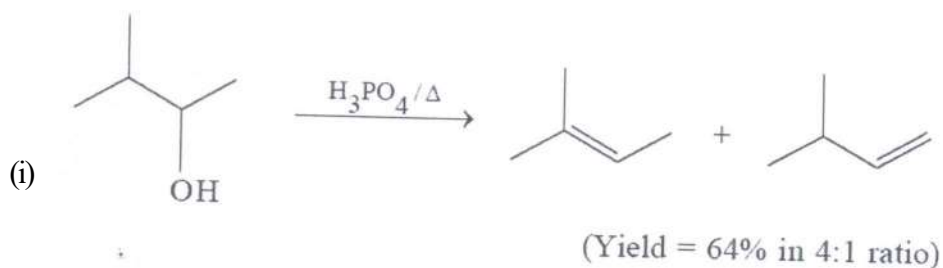
9. (a) Relative rate constants for solvolysis of three bromoalkanes in 60% *EtOH*–*H₂O* and in *H₂O* are as follows :



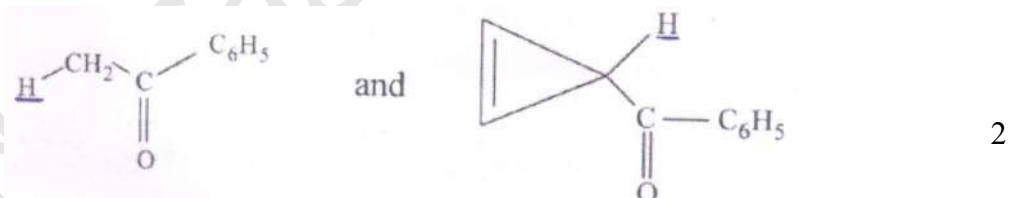
1. 60% <i>EtOH</i> – <i>H₂O</i> (55°C)	1.00	1.78	2.41×10^4
2. <i>H₂O</i> (50°C)	1.00	11.60	1.2×10^6

- (i) Explain why 2-bromo-2-methylpropane undergoes solvolysis more than 10^4 times faster than bromoethane and 2-bromopropane in both solvents.
- (ii) Explain why the relative solvolytic reactivity of 2-bromopropane is significantly larger in *H₂O* than in 60% *EtOH*–*H₂O* as solvent. 3+2

- (b) Suggest mechanisms for the following elimination reactions. Why does the first reaction yield a mixture of products but the second one gives a single product?



10. (a) $CH_3CH(OH)CH_2SEt$ and $CH_3CH(SEt)CH_2OH$ gives the same product when treated with dry HCl . Give the structure of the product and explain its formation. 3
- (b) Which one is more acidic and why? (Underlined H atom)



- (c) Discuss the stereochemistry of dehydrobromination of meso-1, 2-dibromo-1, 2-diphenyl ethane with $NaOEt$ in $EtOH$. Write down the product. 3
- (d) The following reaction normally does not take place. What you should add to the reaction mixture to make it a feasible one? Explain your answer.

