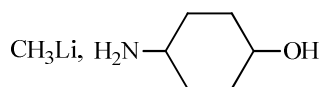


B.Sc. 2nd Semester (Honours) Examination, 2019**CHEMISTRY****(Organic Chemistry-II)****Paper : SH/CHE/202/C-4****Course ID : 21412****Time: 1 Hour 15 Minutes****Full Marks: 25***The figures in the margin indicate full marks.**Candidates are required to give their answers in their own words as far as practicable.***1. Answer any five questions:****1×5=5**

(a) Which of the following is an ambident nucleophile?

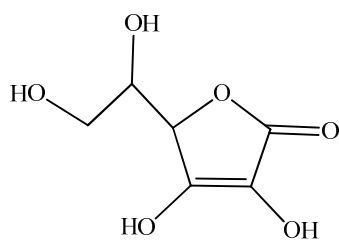


(b) Write down the conjugate acids for the following:

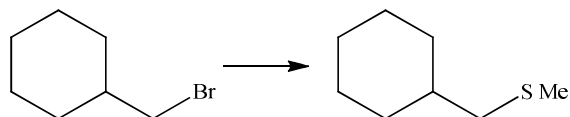


(c) What does the term “Chiral axis” mean?

(d) Indicate the most acidic hydrogen in the following molecule.



(e) What nucleophile is needed in the following conversion?



(f) Give an example of valence tautomerism.

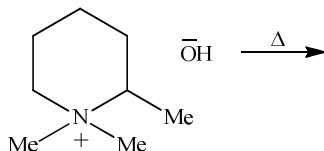
(g) What two different alkyl halides yield $(\text{CH}_3)_2\text{C}=\text{CH}_2$ as the only product of dehydrohalogenation?

(h) Chloral remains in hydrate form — Explain.

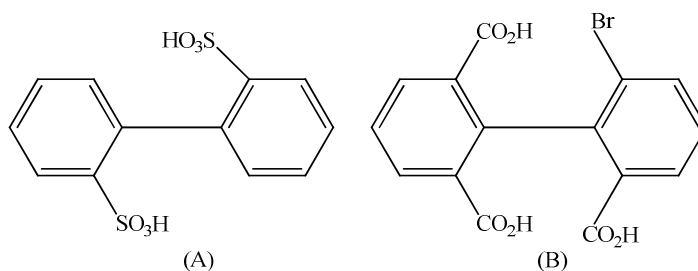
2. Attempt *any two* questions:

5×2=10

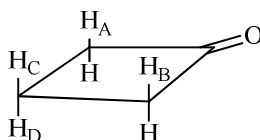
- (a) (i) Give the structure of the major product of the following reaction and explain its formation.



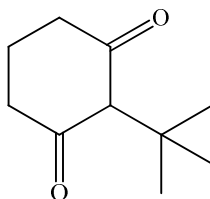
- (ii) What do you mean by the term “Crown ether”? Give the structural formulation of 18-crown-6-ether.
- (iii) 4-Fluoroaniline shows nearly the same basicity as aniline— Explain. $1\frac{1}{2}+2+1\frac{1}{2}=5$
- (b) (i) A hydrocarbon, C_6H_{14} , gives a mixture containing only two monochlorides in photochemical chlorination. One of these compounds solvolyzes very rapidly in ethanol, whereas the other is very slow. Give the structures of hydrocarbon and monochlorides.
- (ii) Explain whether the following compounds are resolvable or not:



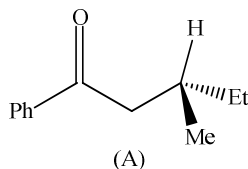
- (iii) Draw the torsional curve for propane showing the different conformers. $2+1+2=5$
- (c) (i) Benzoic acid and acetic acid have approximate pK_a values of 4.20 and 4.80. Suggest with explanation which pK_a value belongs to which acid.
- (ii) Find out the relationship (topicity) of hydrogens marked as H_A/H_B and H_C/H_D in the following compound:



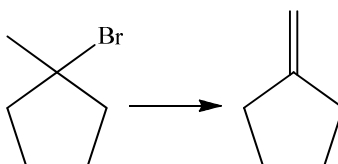
- (iii) Explain why the following compound is 100% ketone. $2+2+1=5$



- (d) (i) Write a short note on “Kinetic Isotope Effect”.
- (ii) Would optically active ketone (A) undergo acid-or base-catalysed racemization? Explain.



- (iii) Carry out the following conversion:

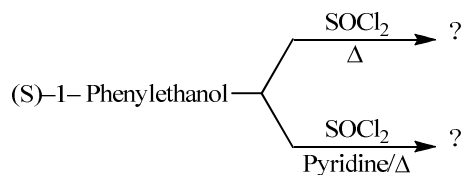


2+2+1=5

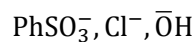
3. Attempt *any one* question:

10×1=10

- (a) (i) Give the stereochemical products with mechanism.

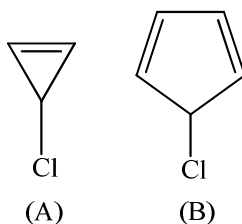


- (ii) What is meant by nucleofuge? Arrange the following in order of nucleofugality:

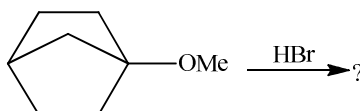


- (iii) $\text{Et} - \text{S} - \text{CH}_2\text{CH}_2 - \text{Cl}$ undergoes hydrolysis at faster rate than $\text{Et} - \text{O} - \text{CH}_2 - \text{CH}_2 - \text{Cl}$. Explain.

- (iv) Compare the rate of solvolysis of (A) and (B) in ethanol.

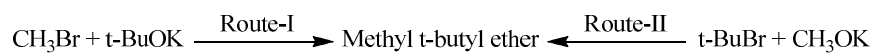


- (v) Give the product(s).



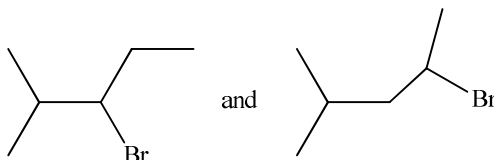
3+2+2+2+1=10

- (b) (i) Your task is to prepare methyl t-butyl ether by one of the following routes.

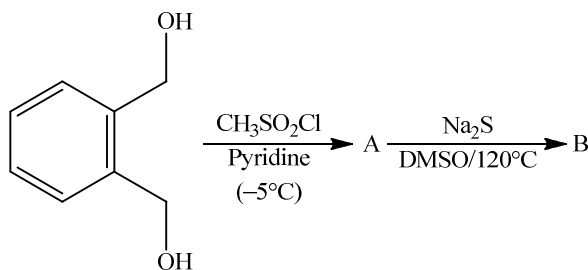


Indicate the route of your choice and explain.

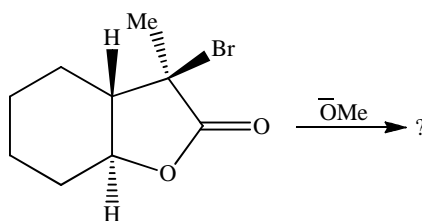
- (ii) Compare with reason the ease of E2 reaction of the following:



- (iii) Identify the product A and B.



- (iv) Draw the preferred conformation through Newmann Projection of n-pentane and 2-chloroethanol.
- (v) Write the product(s) of the following E2 reaction and explain the stereochemical outcome.



2+2+2+2+2=10