

B.Sc. 2nd Semester (Honours) Examination, 2021

CHEMISTRY

(Organic Chemistry-II)

Paper : SH/CHEM/202/C-4

Course ID : 21412

Time: 1 Hour 15 Minutes

Full Marks: 25

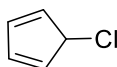
The figures in the margin indicate full marks.

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

1. Answer *any five* questions:

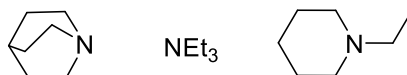
1×5 = 5

(a) Why the following compound is very reluctant towards S_N1 and S_N2 reactions?



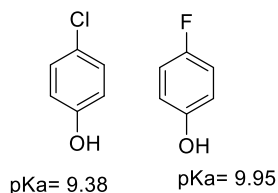
(b) Give one suitable example of a reaction which proceeds via $E1cB$ mechanism.

(c) Arrange the following compounds according to their increasing basicity.



(d) Draw the stable conformation of 2-chloro-1-propanol.

(e) Account for the acidity difference.

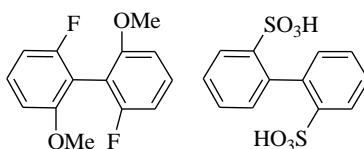


(f) Between *cis* and *trans* isomer of cyclohexane-1,2-dicarboxylic acid, which one is more acidic?

(g) Give one example (structure) of proton sponge effect.

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(h) Which one of the following compounds is resolvable?



2. Answer *any two* questions:

5×2 = 10

(a)

2+(2+1) = 5

(i) Offer a suitable explanation for the different percentage of enol content of the following two compounds

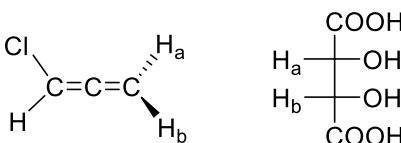
<u>Compound</u>	<u>% of enol content</u>
3-Hexanone	0.05
Cyclohexanone	1.18

(ii) Point out the differences between 'Resonance' and 'Tautomerization'. What is 'Valence Tautomerization'?

(b)

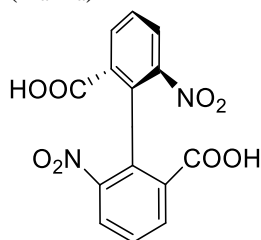
2+2+1 = 5

(i) Find the spatial relationship (Homotopic/Enantiotopic/diastereotopic) between H_a and H_b in the following compounds.



(ii) What is 'Buttressing Effect'?

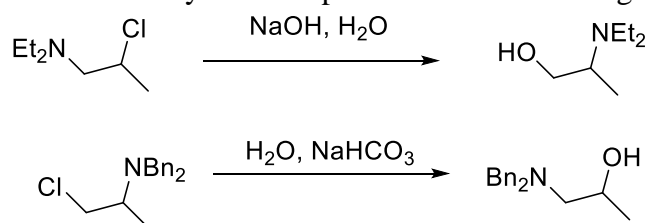
(iii) Predict the absolute configuration (R_a/S_a) of the following compound.



(c)

3+2 = 5

(i) Explain the formation of differently oriented product of the following reaction.



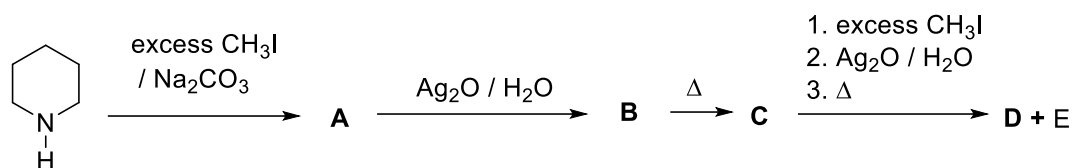
(ii) Provide an explanation for the observation that the pyrolytic elimination of 2-butyl acetate gives both *Z* and *E*-butene (in addition to 1-butene) even though the reaction is a stereospecific *syn* process.

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(d)

1+1+1+1+1 = 5

Write structures for compounds A – E.



3. Answer *any one* question:

10×1 = 10

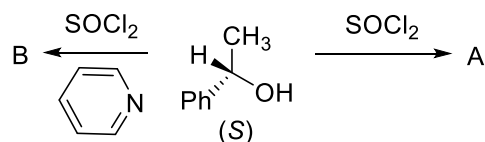
(a)

(2+1)+(3+1)+3 = 10

(i) Convert (-)-2-octanol to (+)-2-octanol. Potassium *tert*-butoxide is often used to promote E2 reaction at the expense of $\text{S}_{\text{N}}2$ reaction - Explain.

(ii) When naphthalene is treated with Conc. H_2SO_4 at 40 °C the main product is 1-derivative but at 140°C the main product is 2-derivative - explain. What is 'Secondary Kinetic Isotopic Effect'?

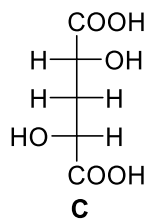
(iii) Predict the stereochemistry of the products (A and B) formed in each of the following reaction with suitable mechanism.



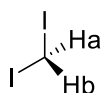
(b)

3+2+(1+4) = 10

(i) C-3 in the dicarboxylic acid **C** is *prochirotopic* but not *prostereogenic* - Explain.



(ii) Designate H_a and H_b as Pro-*R* and Pro-*S*



(iii) What is called Butane-*gauche* interaction? Draw the Potential energy diagram of ethylene glycol for the rotation about C-C bond and label the maxima and minima with appropriate conformation. Compare the relative stabilities of conformations.