B.Sc. 3rd Semester (Honours) Examination, 2019 (CBCS)

Subject : Organic Chemistry-III

Paper : CC-7

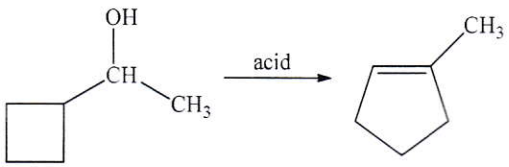
Time: 2 Hours **Full Marks: 40**

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 from the following: 2×5=10

(a) Why does only hydrogen bromide exhibit the peroxide effect?

(b) Explain the following observation:



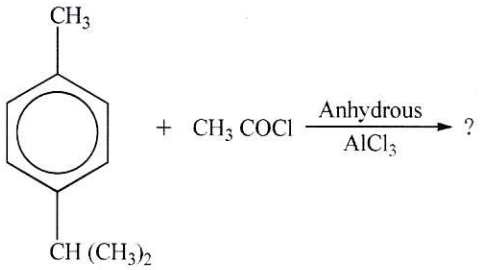
(c) What happens when formaldehyde is treated with ammonia?

(d) What is the reason behind unusual stability of chloral hydrate?

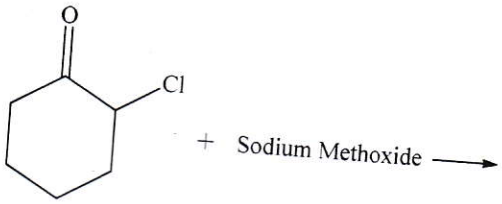
(e) Convert:

$$Ph\ H \longrightarrow Ph\ CH_2\ COOH$$

(f) Complete the following equation and comment:



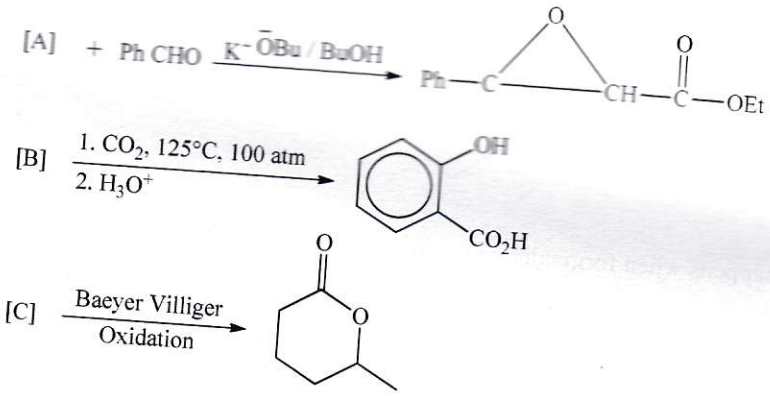
(g) Complete the following:



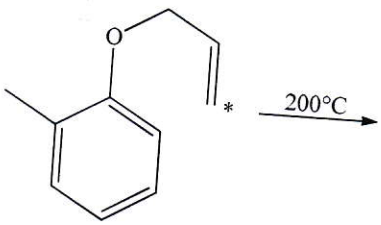
(h) What happens when three moles of acetone undergoes reaction in presence of hydrochloric acid?

2. Answer *any two* questions from the following: 5×2=10

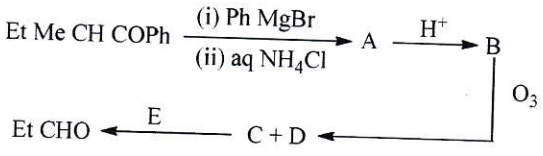
(a) (i) Give the missing reactants in each of the following reactions: 3



(ii) Write the products possible in the given reaction: 2



(b) Supply the structures of A – E in the following: 5



(c) (i) What is the active species during preparation of benzaldehyde by bubbling a mixture of carbon monoxide and hydrogenchloride through a solution of benzene. 2

(ii) What happens when pyrrole is heated with solid potassium hydroxide and then treated with carbon dioxide? 2

(iii) Write down the product when the following compound reacts with SeO_2: 1

Me CH_2 CH_2 C (Me) = CH Me

(d) (i) Classify the following reactions according to B_{AC}^2, A_{AC}^2, A_{AC}^1 and A_{AL}^1 mechanism: 1×4=4

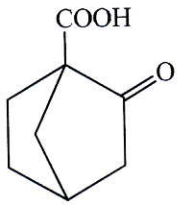
(I) Ph COOH + MeOH $\longrightarrow$ Ph COO Me + H_2O

(II) $CH_3COOC_5H_{11} + \overset{\ominus}{O}H \longrightarrow CH_3COOH + C_5H_{11}\overset{\ominus}{O}$

(III) CH_3COOH + (R) Octan-2-ol $\xrightarrow{H_2SO_4}$

(IV) $CH_3COOH \xrightarrow[-60°C]{F\,SO_3H - SbF_5 - SO_2}$

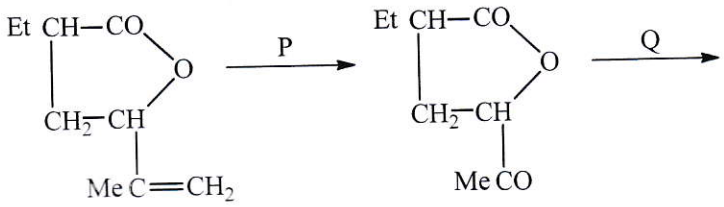
(ii) The β Keto acid (as shown below) is decarboxylated with difficulty — suggest an explanation. 1

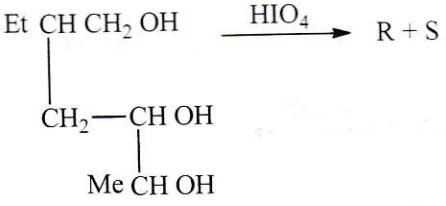


3. Answer *any two* questions from the following: 10×2=20

(a) (i) meso-2,3 Dibromobutane reacts with iodide ion more rapidly than does the (±) compound. What are the respective alkenes formed? — Explain. 4

(ii) What are P–S in the following reactions: 4

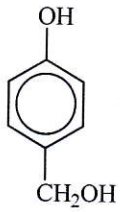


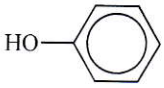


(iii) Mustard gas, $(Cl\ CH_2CH_2-)_2\ S$, is hydrolysed by water to Cl CH_2 CH_2 S CH_2 CH_2 OH at a much faster rate than expected for a primary alkyl halide. Offer explanation in this connection. 2

(b) (i) Complete the following equations: 2×4=8

(I) $\text{Ph Br} \xrightarrow[\text{liq } NH_3]{NaNH_2} ? \xrightarrow{(\text{Et COCH Me})^{\ominus} Na^{\oplus}} ?$

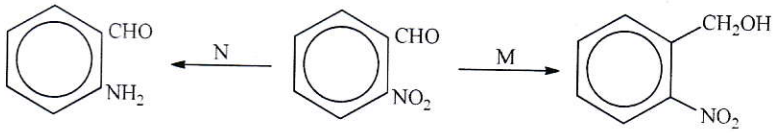
(II)  $+ C_6H_5NO \xrightarrow{Cu} ? \xrightarrow{H^+} ?$

(III)  $+ \text{Cl CH}{\equiv}\text{NH} \xrightarrow{AlCl_3} ?$

$\xrightarrow{H_2O}$?

(IV) $2\ C_6H_5CHO \xrightarrow{KCN} ?$

(ii) Suggest what M and N could be in the reaction: 2



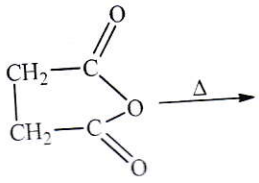
(c) Discuss the mechanism of the following reaction: 2×5=10

(i) $\text{Me}_2\text{ C(Br) COCH}_3 \xrightarrow[\text{Me OH}]{\text{Na OMe}} ?$

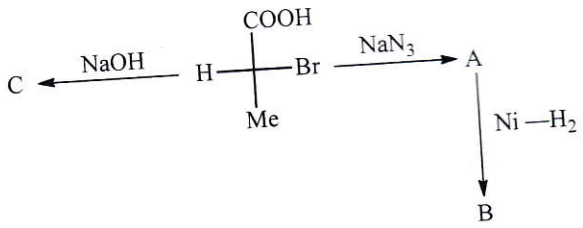
(ii) $\text{CH}_3\text{ COO Et} \xrightarrow[\text{EtOH}]{Na} ?$

(iii) $\text{Et COO Et} \xrightarrow[\text{Benzene}]{Na} ?$

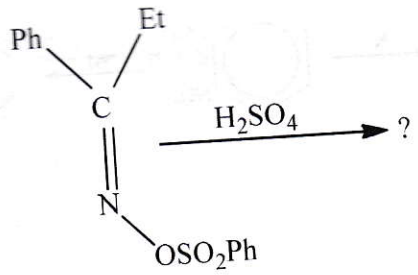
(iv) $Me\,CO\,(CH_2)_3\,COO\,Et \xrightarrow{Et\,ONa}$

(v) $Et\,CHO +$  $\xrightarrow{\Delta}$

(d) (i) Complete the equations and assuming all but one of the steps are S_{N2}, label each product with 'D' or 'L'. — Comment. 3+2=5



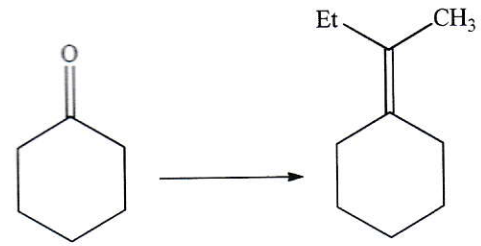
(ii) Discuss the mechanism and stereo chemistry of the final product for the reaction: 2+1=3



(iii) Acetyl chloride is rapidly decomposed by water but benzoyl chloride only very slowly. —Suggest an explanation. 2

(e) Convert with mechanism:

(i)



Identify the name reaction. 3+1=4

(ii) Write short notes: 3×2=6

(I) Cannizaro Reaction

(II) Michael Reaction