B.Sc. 3rd Semester (Honours) Examination, 2022 (CBCS)

Subject : Chemistry

Paper : CC-VII

(Organic Chemistry)

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

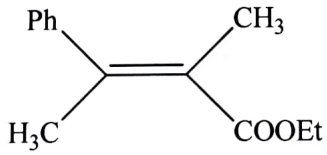
(a) Convert E-2-butene to Z-2-butene.

(b) Why Zn amalgam is used in Clemenson's reduction instead of Zn metal?

(c) What happens when Meso-2, 3-dibromobutane is treated with metallic Zn in methanol?

(d) Allene reacts with hydrogen bromide to afford two isomeric bromopropanes of which one is obtained as major product. Explain.

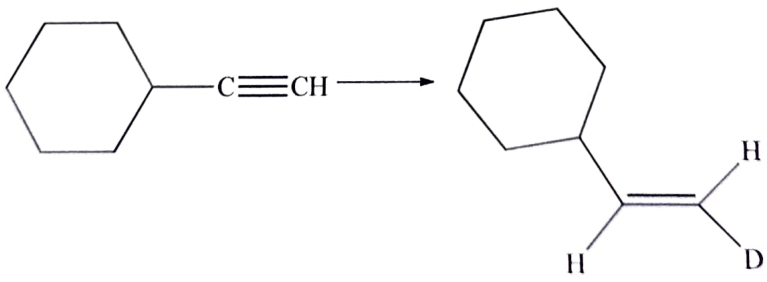
(e) Use Reformatsky reaction to synthesise



(f) Use Diels Alder reaction to synthesise α–naphthol.

(g) Why Red P is used in HVZ reaction of carboxylic acid?

(h) Convert



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

(a) (i) Convert Benzoic acid to acetophenone.

(ii) What is the full form of PCC? How it can be used to oxidise alcohol to carbonyl compound? Show mechanism. 2+3

(b) (i) What happens when benzaldehyde is treated with Ethyl methyl ketone in (i) acidic medium? (ii) In basic medium? 2+3

(ii) Identify [A] to [C] in the given reaction sequence.

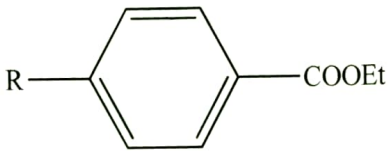
$$TsO-(CH_2)_4-OTs \xrightarrow[heat]{Ph_3P(excess)} [A] \xrightarrow[2\ equiv.]{PhLi} [B] \xrightarrow[2\ equiv.]{PhCHO} [C]$$

(c) (i) Para-nitro benzaldehyde and para-dimethylaminobenzaldehyde fail to undergo Benzoin Condensation but a mixture of these two aromatic aldehydes undergo the reaction. Explain.

(ii) Treatment of para-bromophenol with sodamide in liq.NH_3 at $-33°C$ furnishes para-aminophenol. Explain with mechanism. 3+2

(d) (i) Illustrate the use of diazomethane for conversion to higher homologues of both cyclic and acyclic ketones. Show possibilities of formation of any other product.

(ii) Write the B Ac2 mechanism of hydrolysis of the following ester:

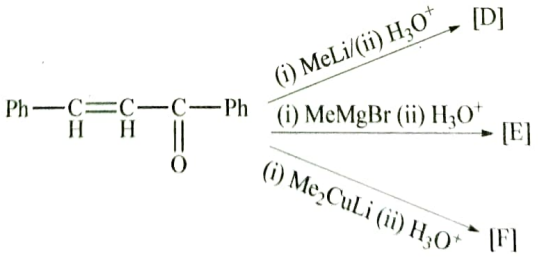


Compare the rate of hydrolysis of esters when R = – OMe and – NO_2 with proper explanation. 2+3

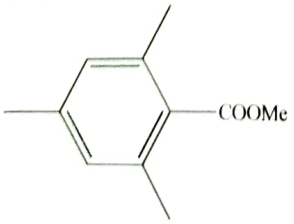
3. Answer any two questions from the following: 2×10=20

(a) (i) Acetals and ketals regenerate the corresponding carbonyl compounds upon treatment with an aq. acid but 1,3-dithianes are stable in acid. However 1,3-dithianes are cleaved upon treatment with HgCl2 solution. Explain.

(ii) Draw the structure of the products [D] to [F].

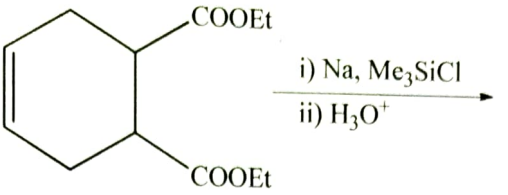


(iii) When

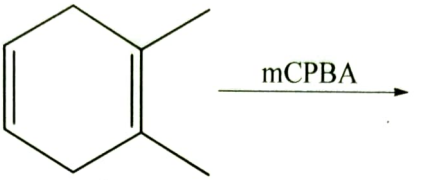


is dissolved in conc. H_2SO_4 and then poured into ice water quantitative yield of mesitoic acid is obtained. Write the mechanism and explain. 4+3+3

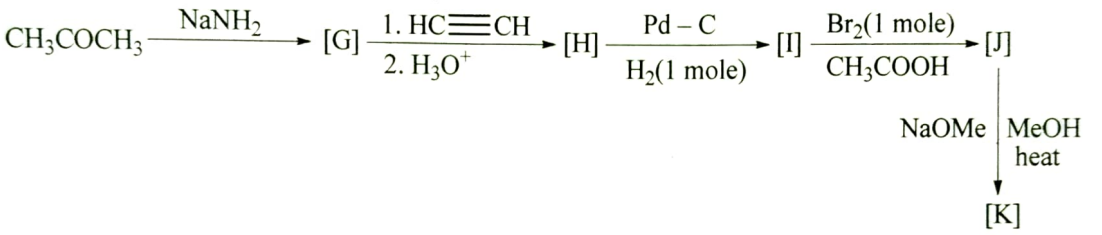
(b) (i) Explain the following reaction with mechanism.



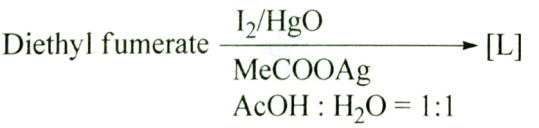
(ii) Give the product and explain.



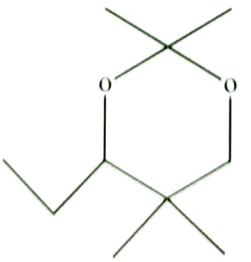
(iii) Identify the products: 3+2+5



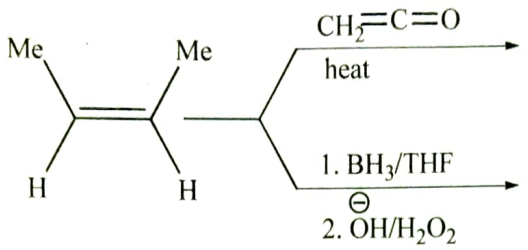
(c) (i) Comment about the optical activity of the product.



(ii) Synthesise the following compound from EAA:



(iii)



3+3+4

(d) (i) Addition of Br_2 to E-2-butene gives exclusively the meso-dibromide but reaction of E-1-phenylpropene with Br_2 furnishes a mixture of threo- and erythro-dibromide. Offer an explanation.

(ii) Ozonisation of 2,3-dimethyl-2-butene in presence of formaldehyde gives the ozonide of isobutene as one of the products —Why?

(iii) Select the best way for reducing carbonyl  to  in each of the following with reason:

$BrCH_2CH_2CHO$

$Me_2CH(OH)CH_2CH_2COCH_3$

(iv) 2 moles acetylene $\xrightarrow[NH_4Cl,\ O_2]{CuCl}$?

3+3+
