

2021

CHEMISTRY — HONOURS

Paper : CC-7

(Organic Chemistry)

Full Marks : 50

*The figures in the margin indicate full marks.**Candidates are required to give their answers in their own words as far as practicable.*

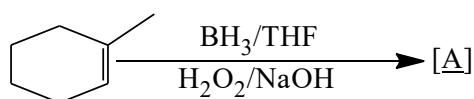
Answer **question number 1** (compulsory) and **any eight (08)** questions from the rest (from **question number 2** to **question number 12**).

1. Answer **any ten** questions :

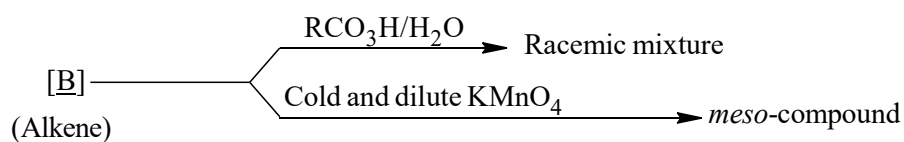
1×10

(a) Give the structural formula for the alkene that gives one mole of glyoxal and two moles of acetone after ozonolysis.

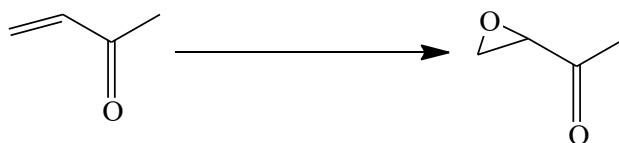
(b) Identify the product [A].



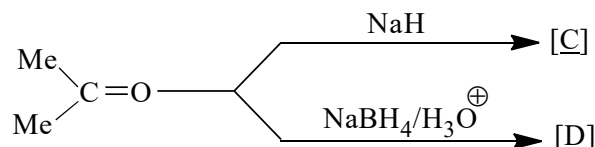
(c) Identify the alkene [B].



(d) Write the suitable reagent for the following transformation :



(e) Identify [C] and [D].

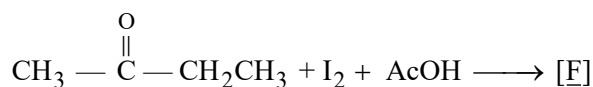
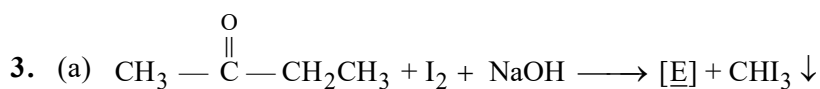


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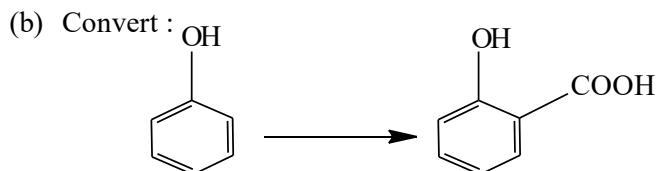
- (f) Prepare (E) -2-butene from 2-butyne.
- (g) R^1CHO reacts with $PhNHNH_2$ to form the corresponding phenylhydrazone. What pH is suitable for this reaction?
- (h) $Ph_3P^{\oplus}-CH_2^{\ominus}$ on reaction with $RCH=O$ forms $RCH=CH_2$ (alkene), whereas $Me_2S^{\oplus}-CH_2^{\ominus}$ on treatment with $RCH=O$ forms the compound $RCH-\overset{\text{O}}{\text{---}}-CH_2$ (epoxide). Explain.
- (i) What will be the order of nucleophilic addition to the following carbonyl compounds?
HCHO, CH_3CHO , CH_3COCH_3
- (j) Write down the products of addition of HBr to
(i) $O_2N-CH=CH_2$
(ii) $Br-CH=CH_2$
- (k) CH_3COCH_3 can be reduced to $CH_3CH_2CH_3$ in almost neutral condition *via* thioketal. Give the method.
- (l) $Ph_3P=CHOMe$ on treatment with $CH_3CH=O$ gives $CH_3CH=CHOMe$, which on acid hydrolysis gives CH_3CH_2CHO . Give the mechanism of hydrolysis.
2. (a) Predict the product with plausible mechanism :



- (b) Benzoin ($PhCHOHCOPh$) on treatment with alcoholic KCN in presence of *p*-nitrobenzaldehyde gives another benzoin. Explain. 3+2

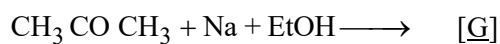


Show the mechanism of formation of [E] and [F].

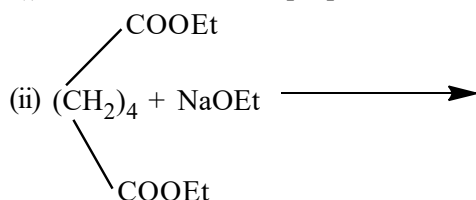
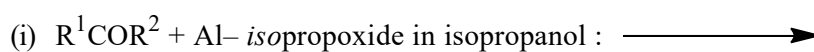


4. (a) How can you obtain 100% $\text{CH}_3\text{CH}(\text{OH})-\underset{\text{CH}_3}{\text{CH}}-\text{CHO}$ from CH_3CHO and $\text{CH}_3\text{CH}_2\text{CHO}$?

(b) Write down the products of the following reactions :



5. (a) Predict the products with plausible mechanism :

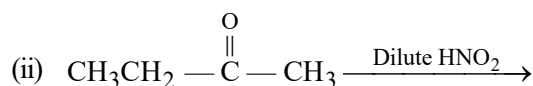
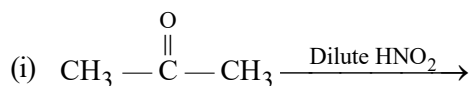


(b) The compound $\begin{array}{c} \text{H}_3\text{C} \quad \text{OH} \\ \diagdown \quad \diagup \\ \text{C} \\ \diagup \quad \diagdown \\ \text{H}_3\text{C} \quad \text{C} \equiv \text{CH} \end{array}$ in presence of H_2SO_4 gives α, β -unsaturated carbonyl compound.

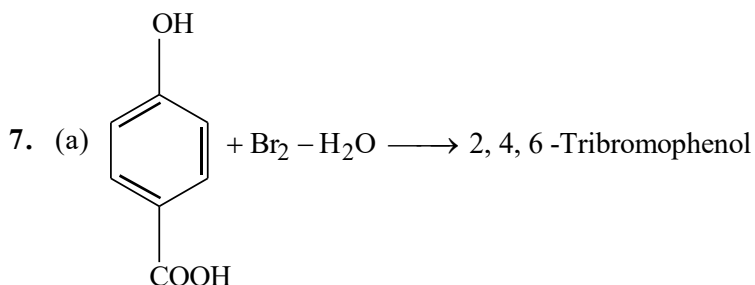
Explain the reaction with mechanism.

3+2

6. (a) Predict the products with plausible mechanism :

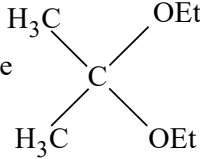


(b) Which product do you expect when *trans*-2-butene is treated with CH_2I_2 and Zn-Cu couple? 3+2

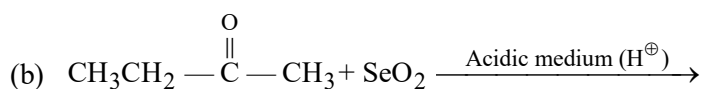
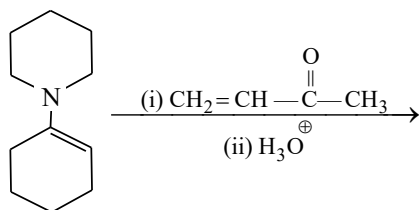


What kind of substitution is involved at *p*-position of the abovesaid reaction?

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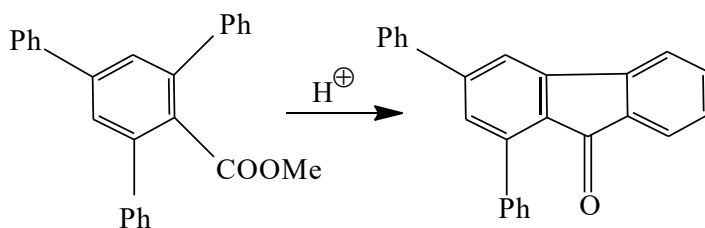
- (b) The molecule  is stable in alkali but cleaves to CH_3COCH_3 under acidic condition. Explain. 3+2

8. (a) Show the product of the reaction along with plausible mechanisms for both the steps :

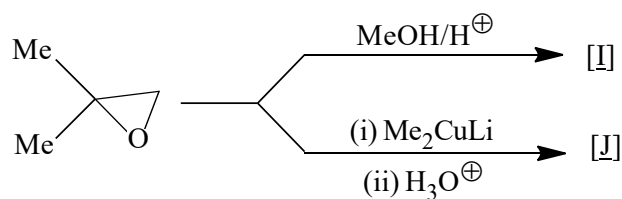


Predict the product and show the mechanism. 3+2

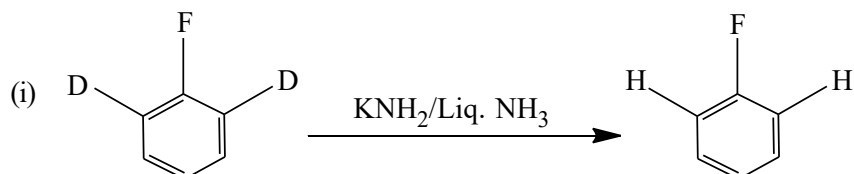
9. (a) Show the steps of the transformation shown below.



- (b) Predict the products of the following transformations : 3+2

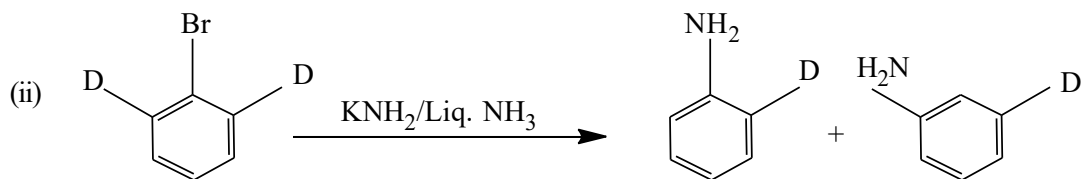


10. (a) Explain with mechanism, the formation of products in the following transformations :

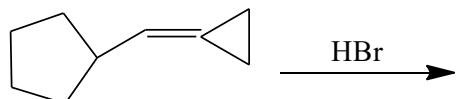


(5)

V(3rd Sm.)-Chemistry-H/CC-7/CBCS

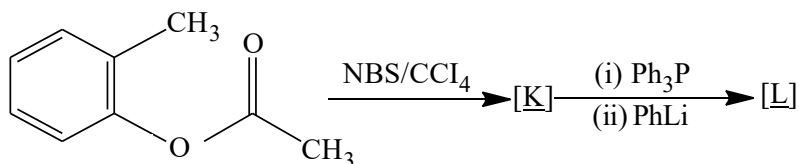


(b) Predict the product with plausible mechanism of the following reaction :



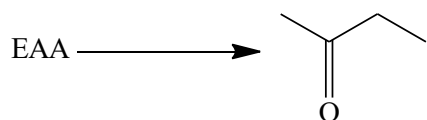
3+2

11. (a) Identify the products [K] and [L] of the following reactions with mechanism.

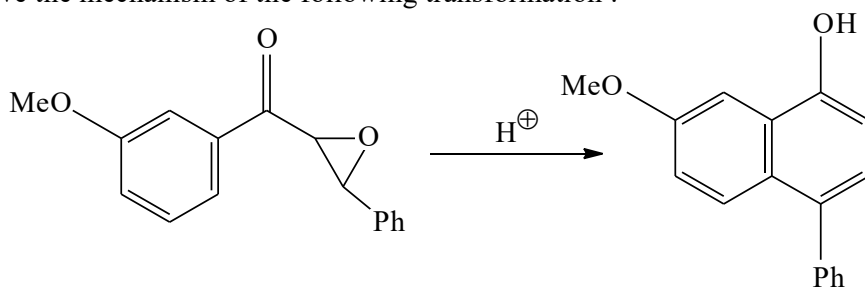


(b) Carry out the following transformation :

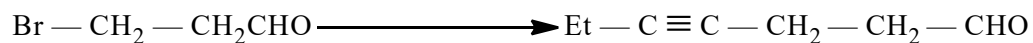
3+2



12. (a) Give the mechanism of the following transformation :



(b) Carry out the following transformation :



3+2