

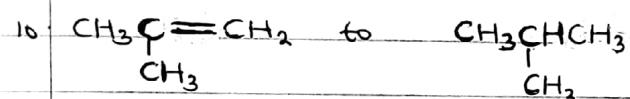
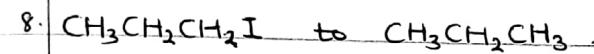
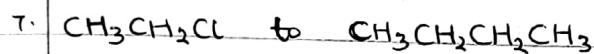
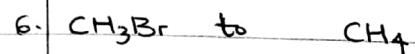
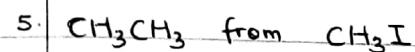
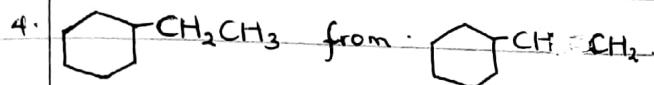
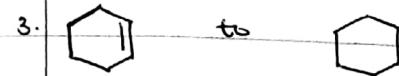
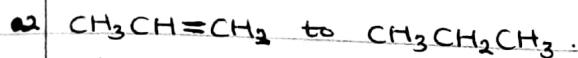
THE SYNTHESIS
OF
ORGANIC COMPOUNDS

S. SEKYEJWE · A. RONALD

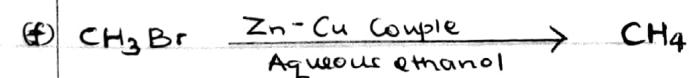
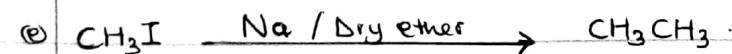
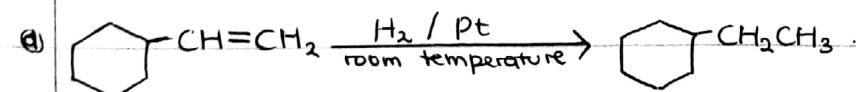
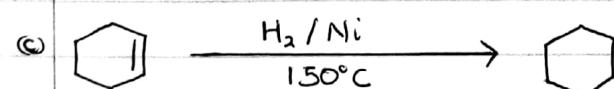
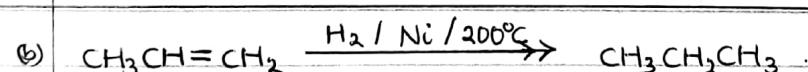
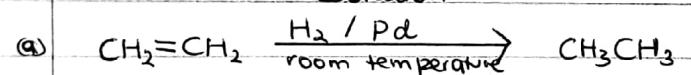
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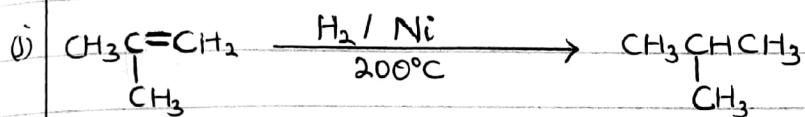
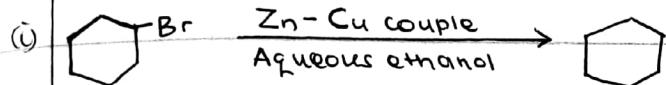
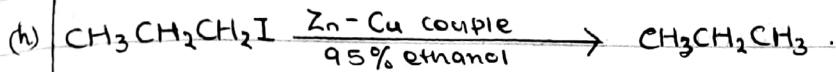
- 2016 -

1 Show how the following compounds can be synthesised.

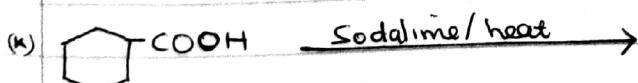
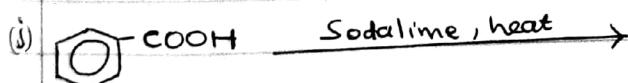
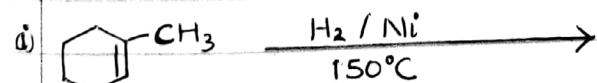
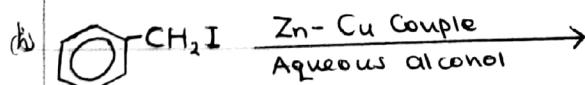
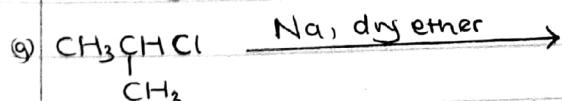
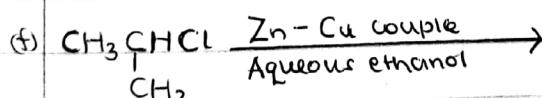
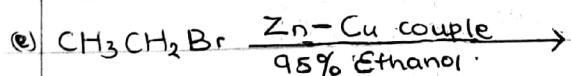
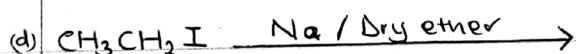
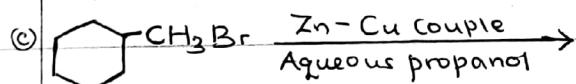
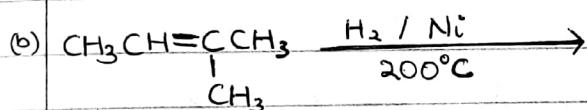
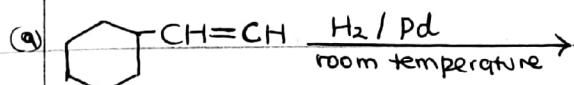


Solution:



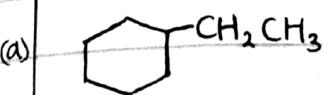


2. Complete the following equations and in each case give the IUPAC name of the major organic compound.



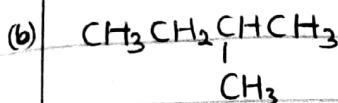
Solution :

① Product



Name :

Ethylcyclohexane



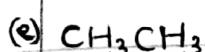
2-Methylbutane



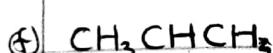
Methylcyclohexane



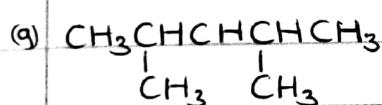
Butane



Ethane



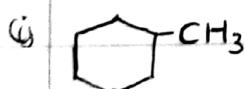
Propane



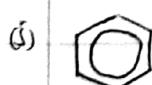
2,4-dimethylbutane



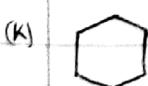
Methylbenzene



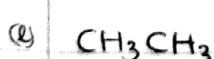
Methylcyclohexane



Benzene

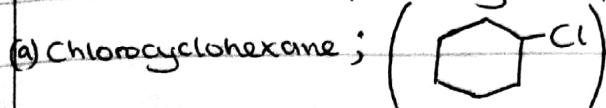


Cyclohexane

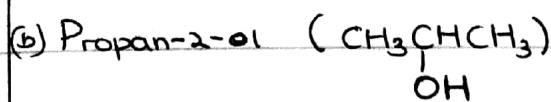


Ethane

3. (a) Show how the following compounds can be synthesised from



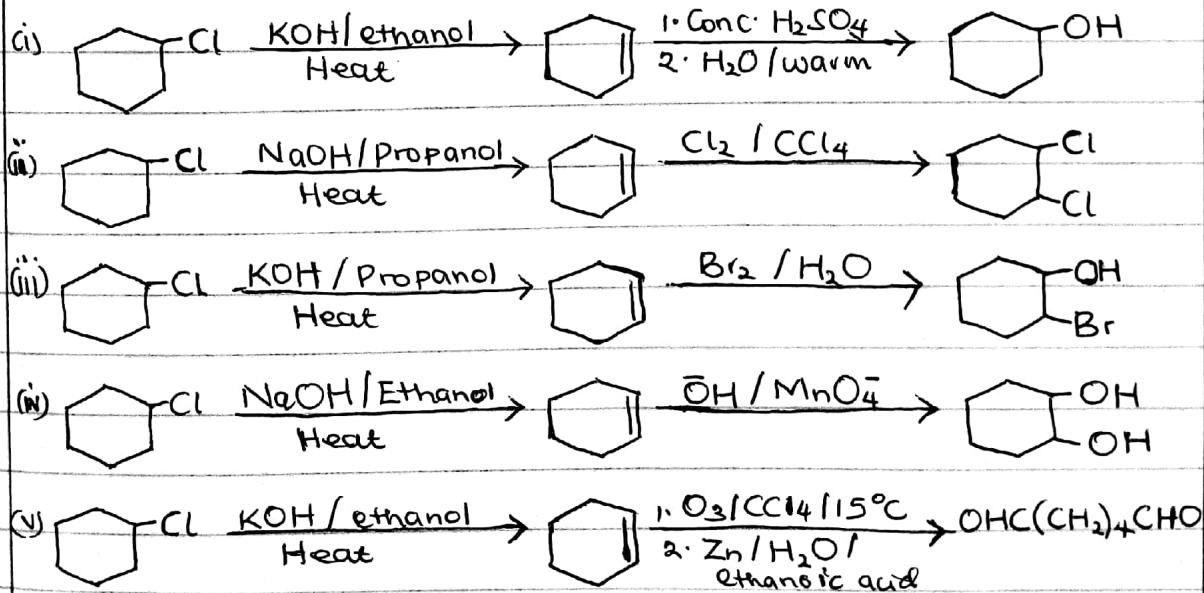
- (i) Cyclohexanol
- (ii) 1,2-dichlorocyclohexane
- (iii) 2-bromocyclohexanol
- (iv) 1,2-Cyclohexanediol (Cyclohexane-1,2-diol)
- (v) $\text{OHC}(\text{CH}_2)_4\text{CHO}$



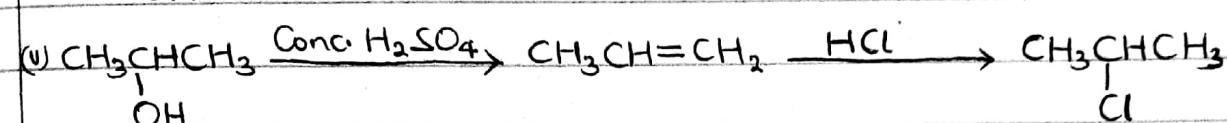
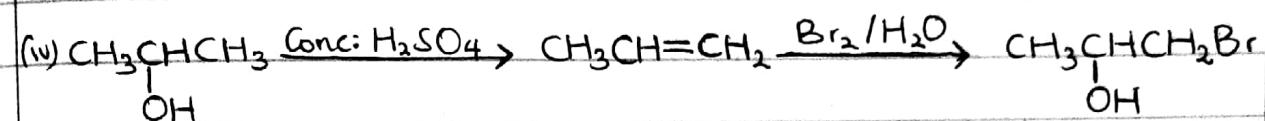
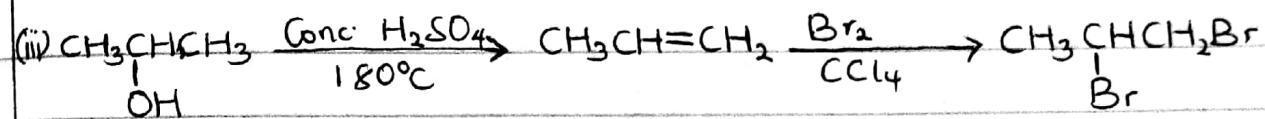
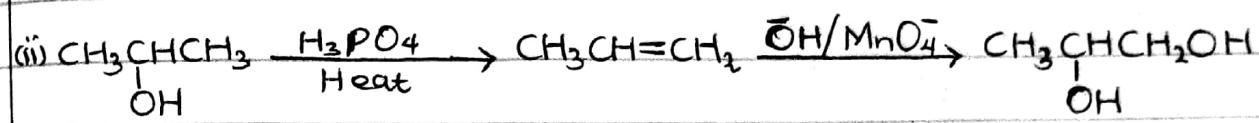
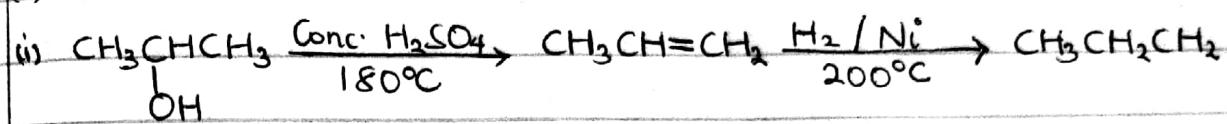
- (i) Propane
- (ii) Propane-1,2-diol
- (iii) 1,2-dibromopropane
- (iv) 1-bromopropan-2-ol
- (v) 2-Chloropropane

Solution

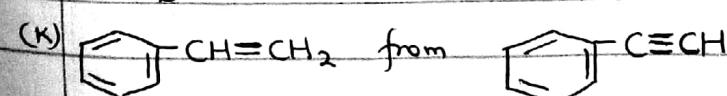
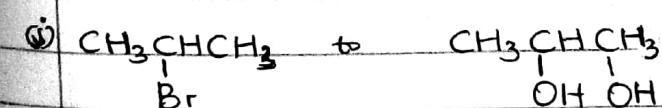
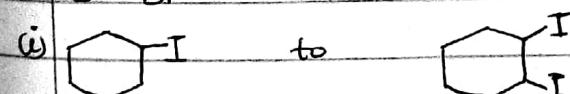
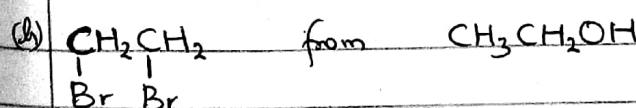
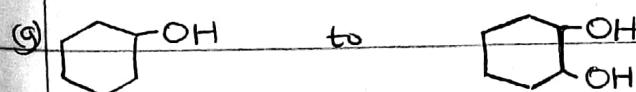
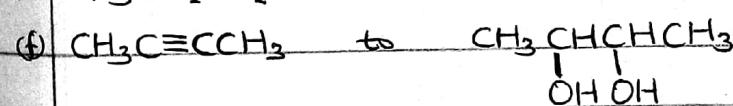
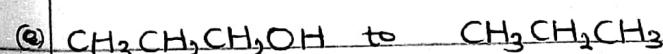
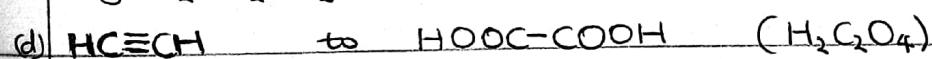
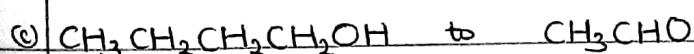
3. (a)



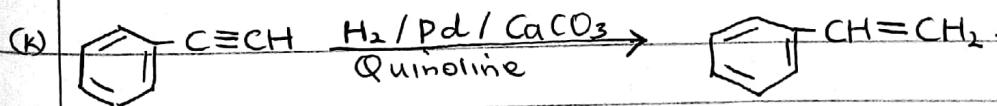
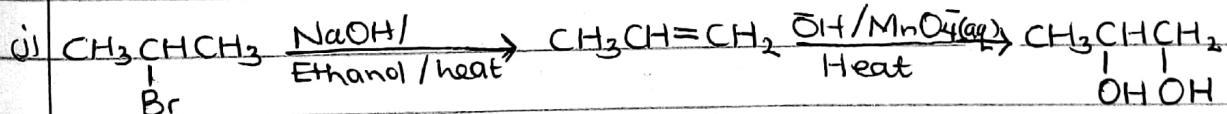
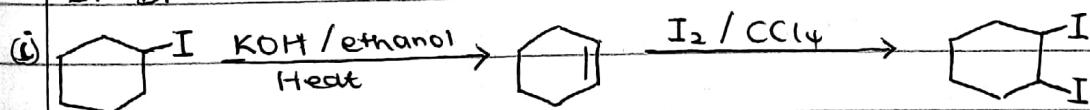
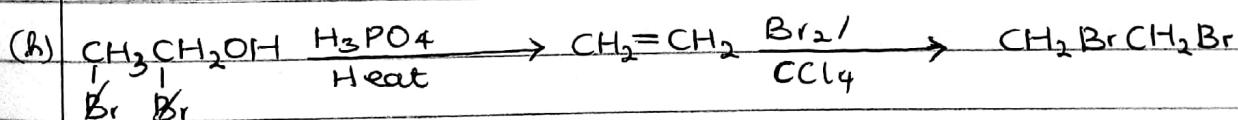
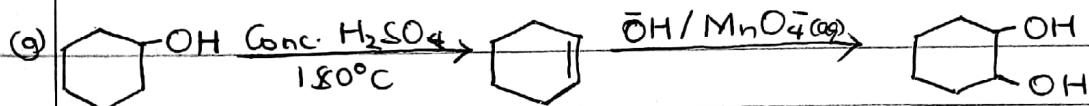
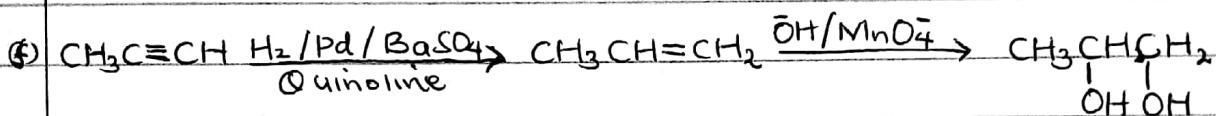
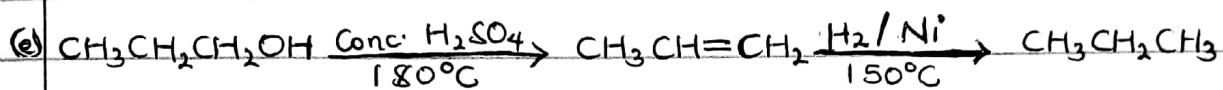
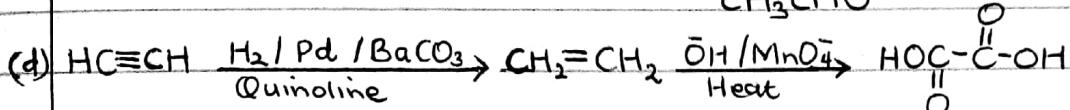
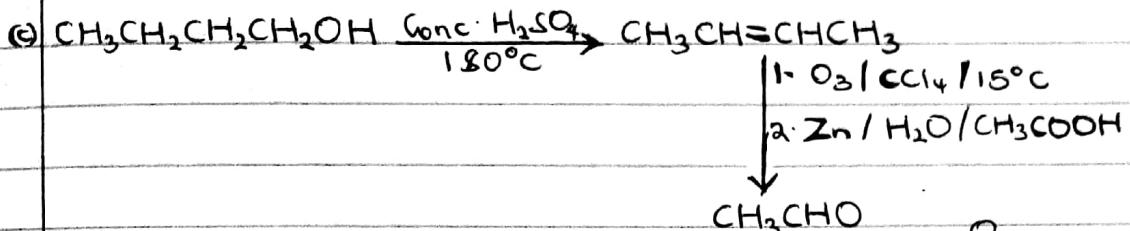
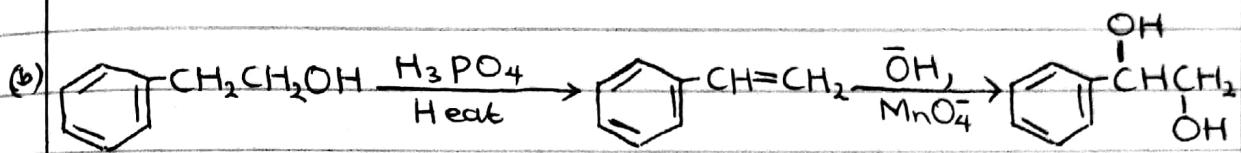
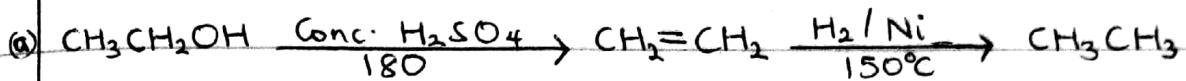
(b)



4 Show how the following conversions can be made. Indicate all conditions for the reactions.



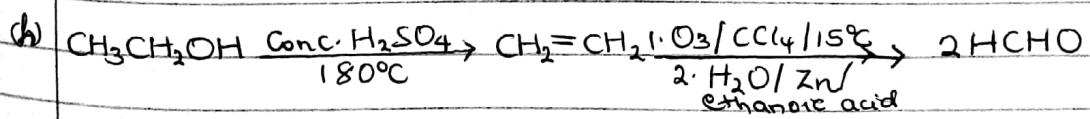
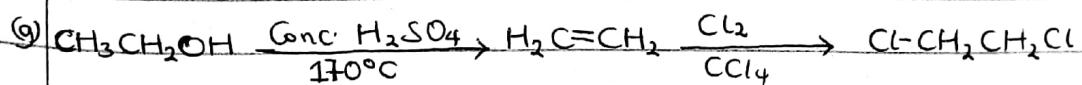
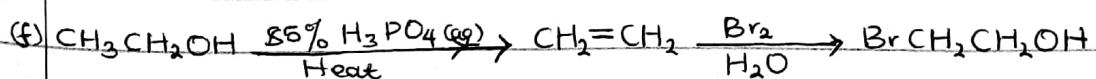
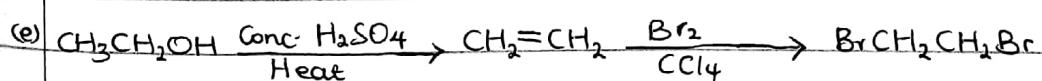
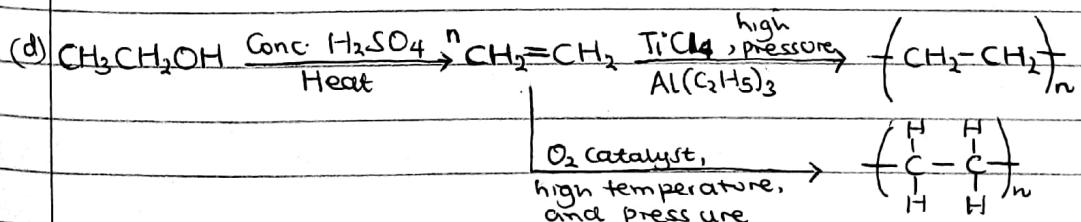
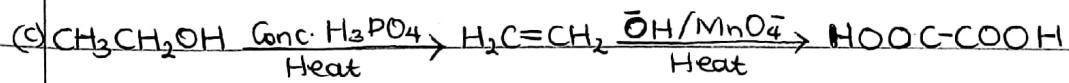
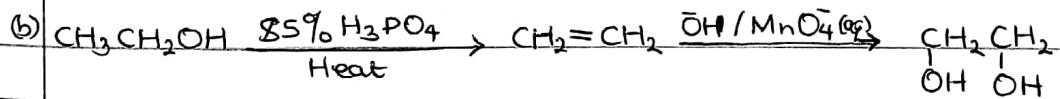
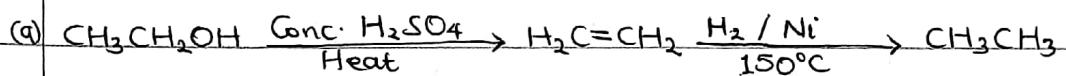
Solution

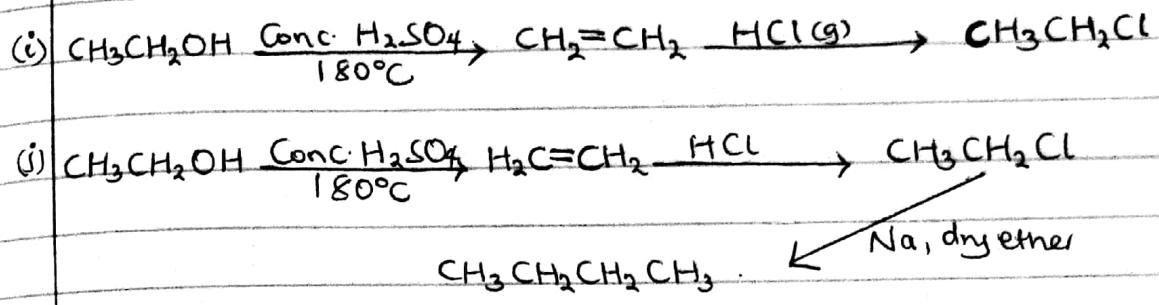


5 Write equations to show how ethanol can be converted to the following

- (a) Ethane
- (b) Ethane-1,2-diol
- (c) Ethanedioic acid
- (d) Poly-ethene
- (e) 1,2-dibromoethane
- (f) 2-bromoethanol
- (g) 1,2-dichloroethane
- (h) Methanol
- (i) Chloroethane
- (j) Methane
- (k) Butane

Solution





6 Show how the following compounds can be synthesised from

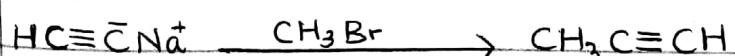
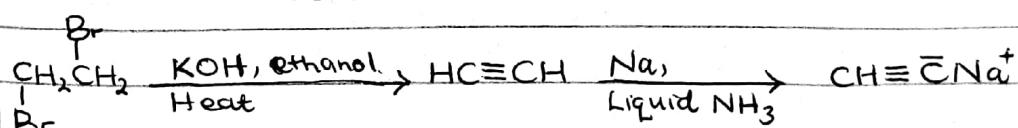
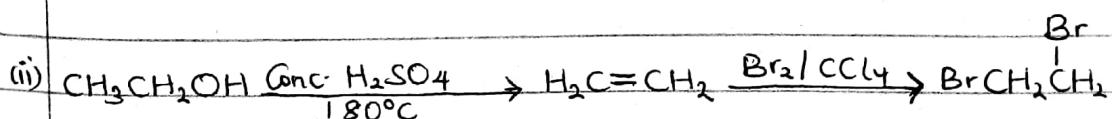
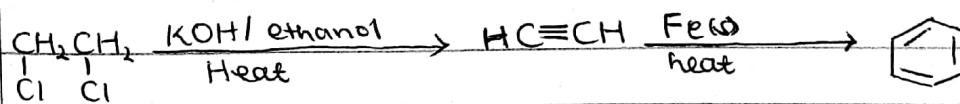
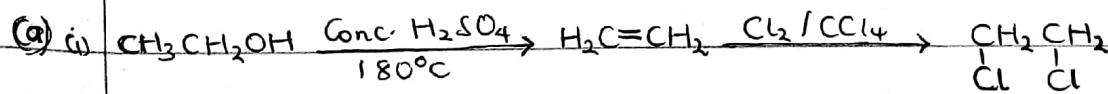
(a) Ethanol

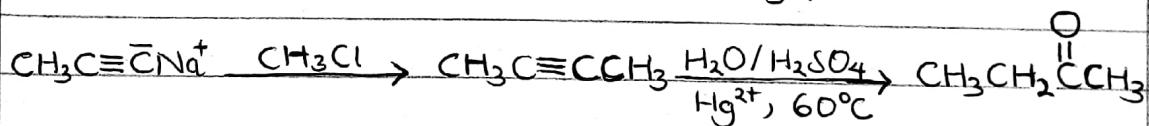
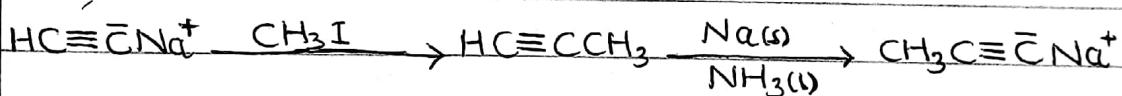
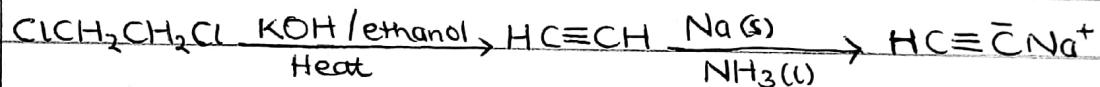
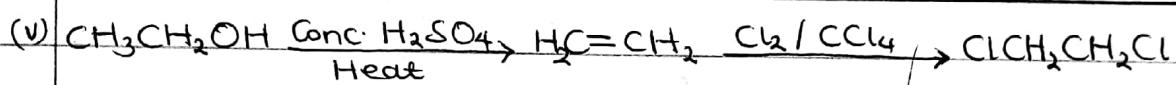
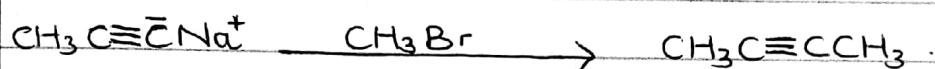
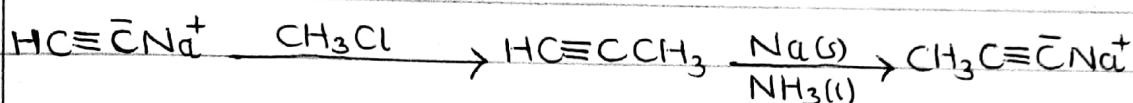
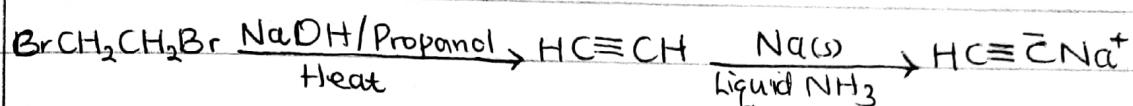
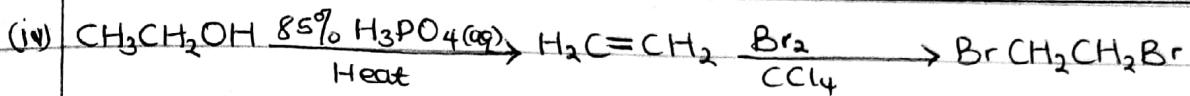
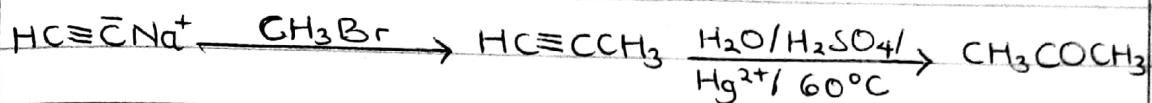
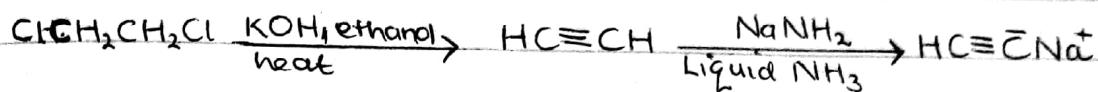
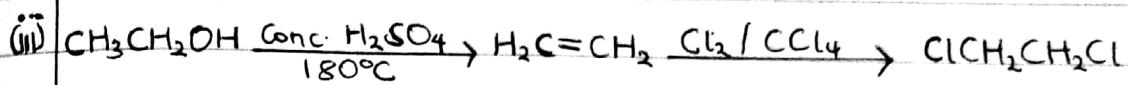
- (i) Benzene
- (ii) Propyne
- (iii) Propanone
- (iv) But-2-yne
- (v) Butanone

(b) 1,2-dichloroethane

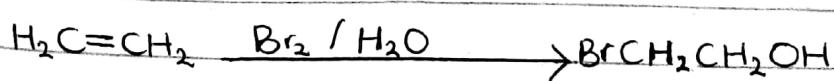
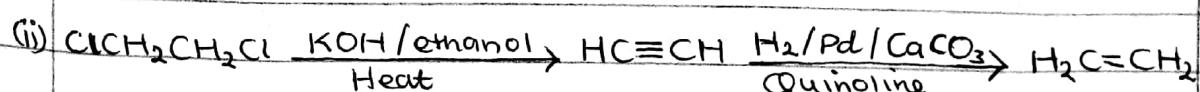
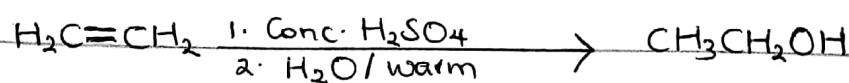
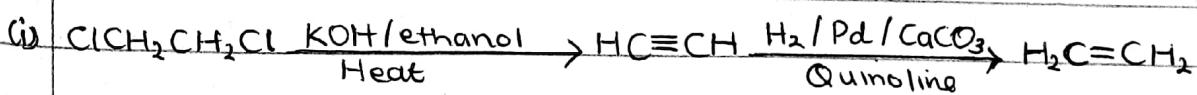
- (i) Ethanol
- (ii) Bromoethanol
- (iii) Benzene
- (iv) Butane
- (v) Ethanal

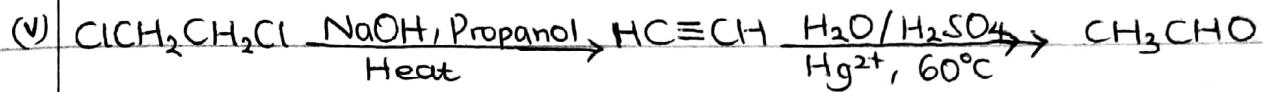
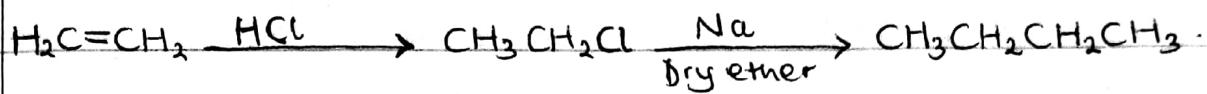
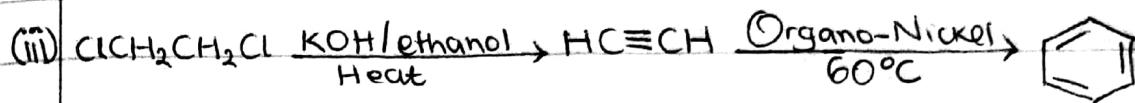
Solution





(b)





7 Write equations to show how the following conversions can be made. Include all conditions for the reaction

(a) 1,2-dichloropropane to

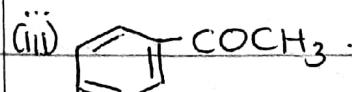
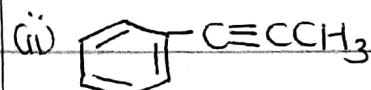
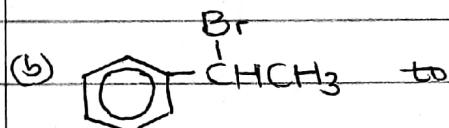
(i) Propanone

(ii) 2,2-dichloropropane

(iii) Propan-2-ol

(iv) 2-chloropropane

(v) Butanone



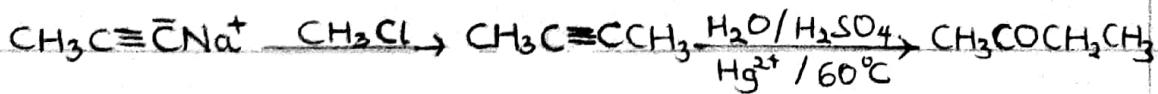
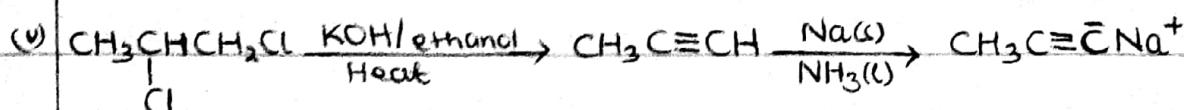
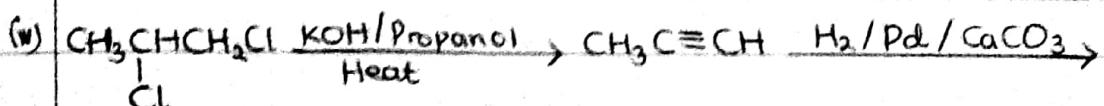
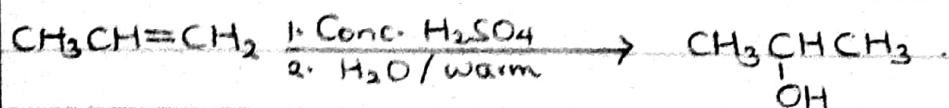
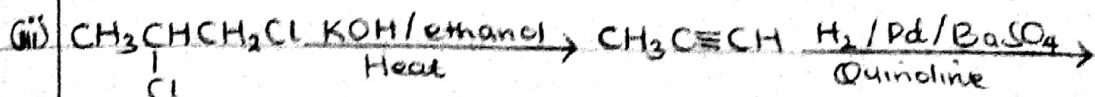
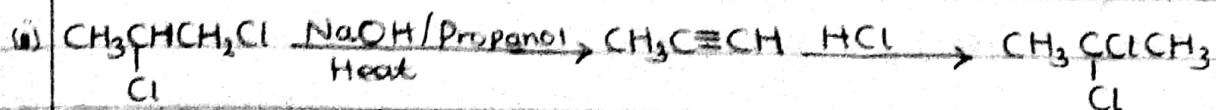
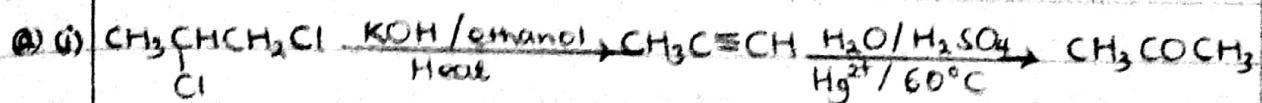
(c) 2-Chloropropane to

(i) Propanone

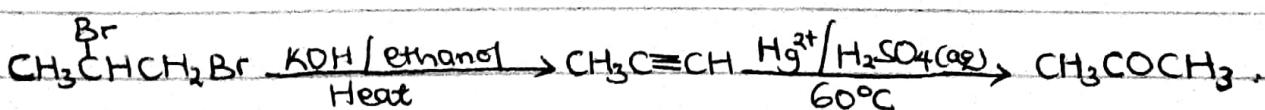
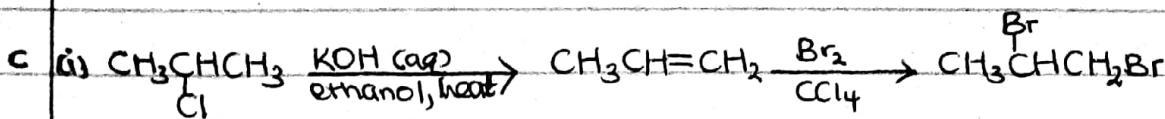
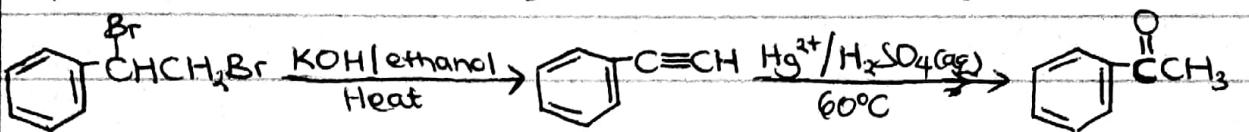
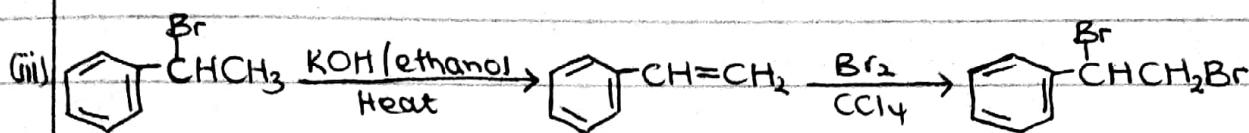
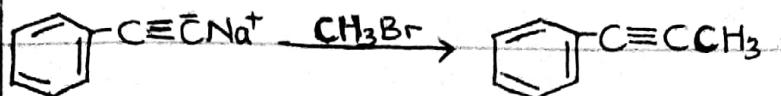
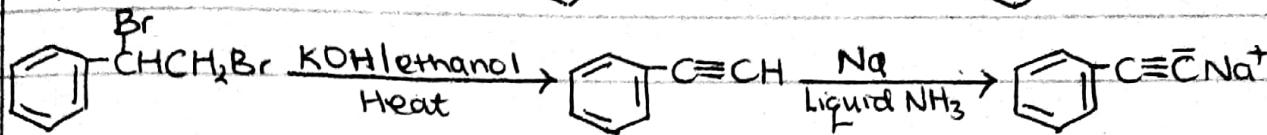
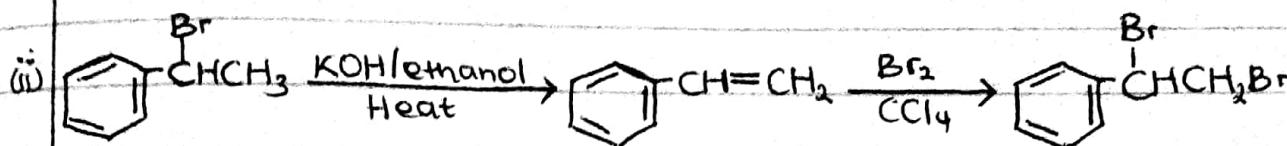
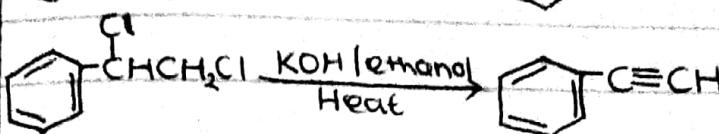
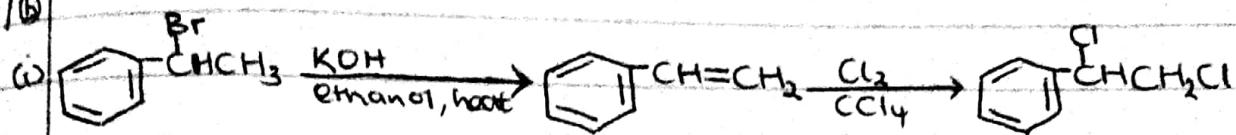
(ii) Propyne

(iii) But-2-yne

Solution

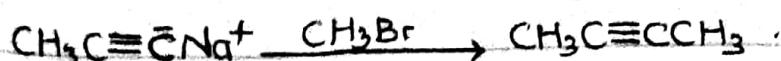
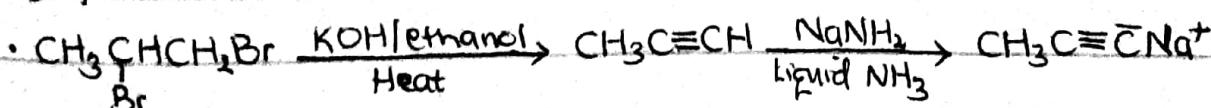


7(b)



(ii) Part of (i) above.

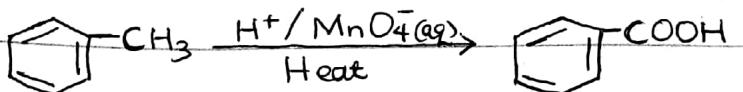
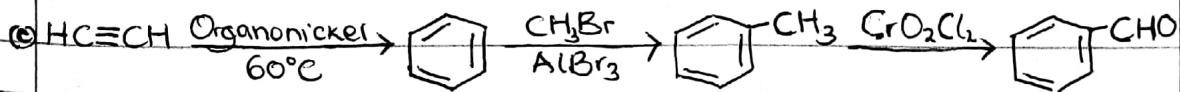
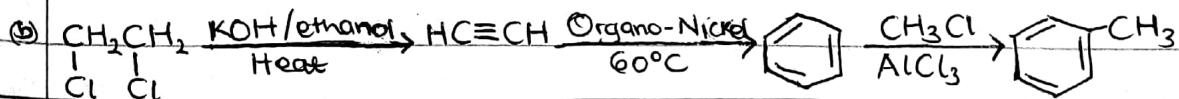
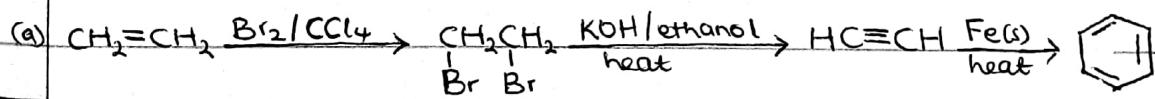
(iii) Part.

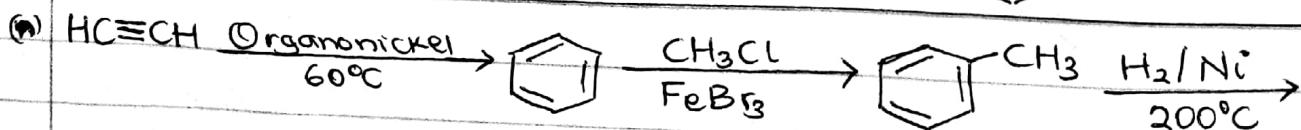
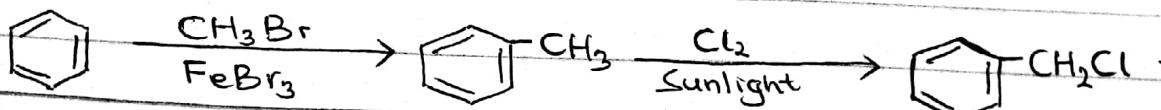
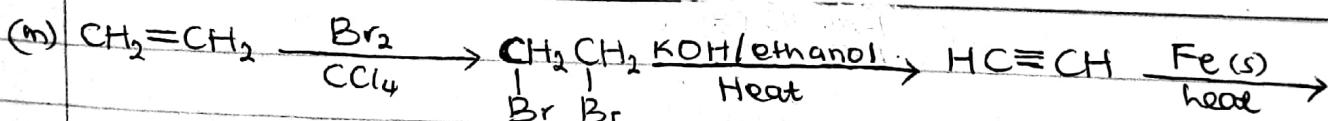
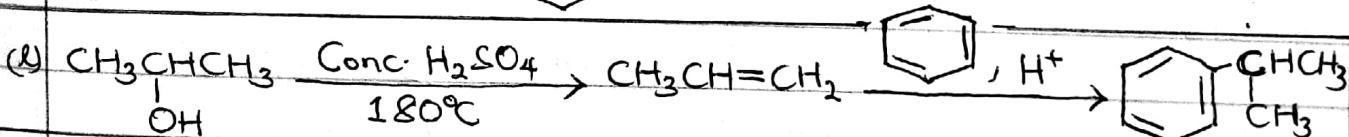
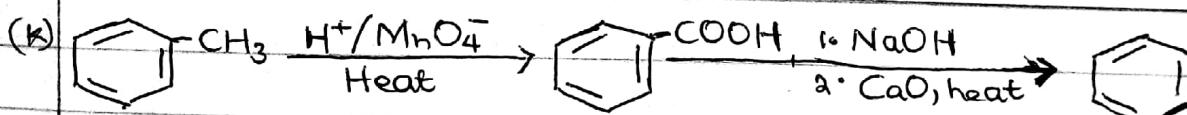
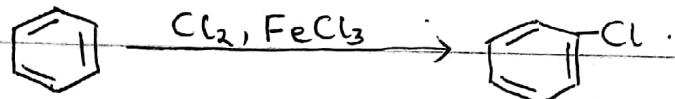
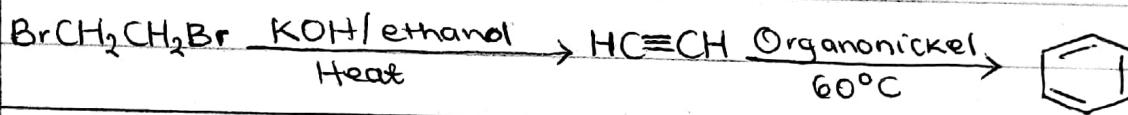
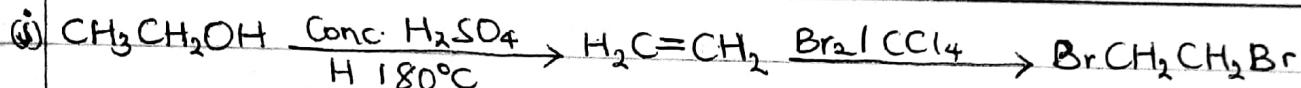
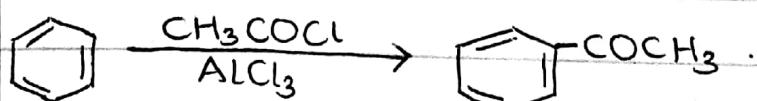
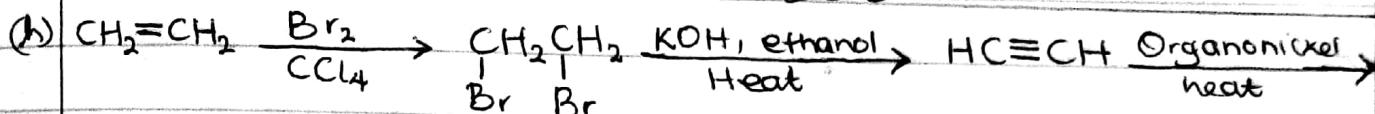
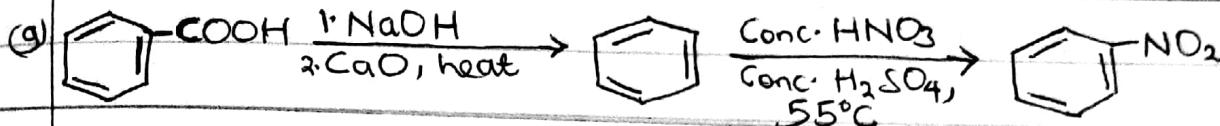
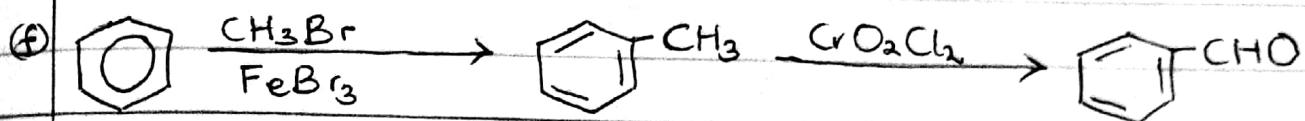


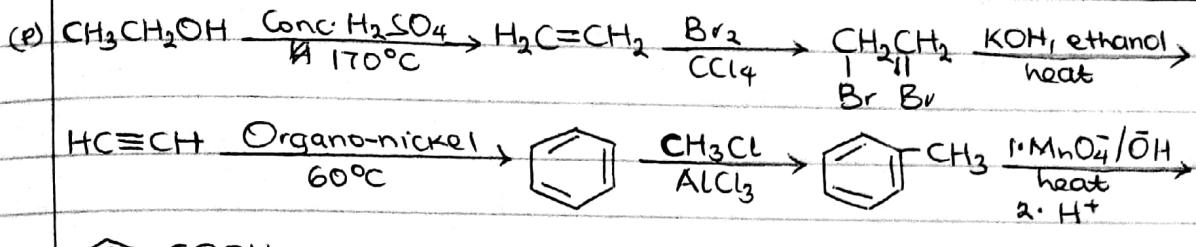
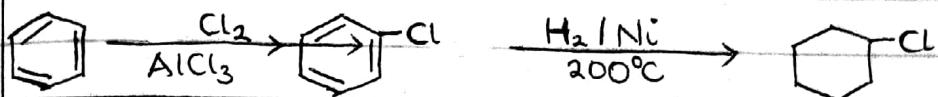
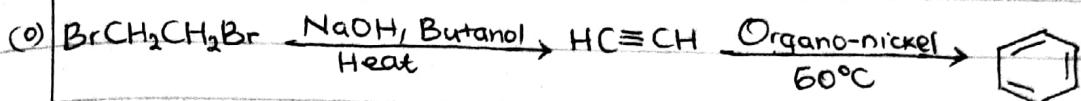
8 Write equations to show how the following compounds can be synthesised. Include conditions for the reactions in each case.

- (a) Ethene to benzene
- (b) 1,2-dichloroethane to methylbenzene
- (c) Ethyne to benzaldehyde
- (d) 1,2-dibromoethane to benzoic acid
- (e) Ethyne to benzene-sulphonic acid
- (f) Benzene to benzaldehyde
- (g) Nitrobenzene from benzoic acid
- (h) Phenylethanone from ethene
- (i) Ethyne to Ethylbenzene
- (j) Chlorobenzene from ethanol
- (k) Bromobenzene from Methylbenzene
- (l) Propan-2-ol to (1-methylethyl)benzene
- (m) Ethene to (chloromethyl)benzene
- (n) Ethyne to methylcyclohexane
- (o) Chlorocyclohexane from 1,2-dichloroethane
- (p) Benzoic acid from ethanol

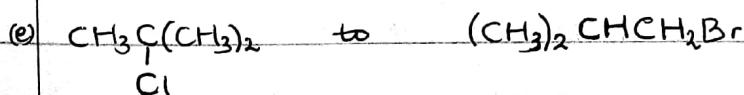
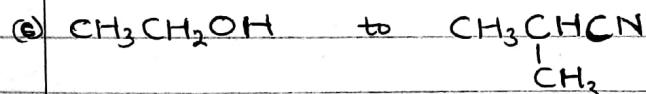
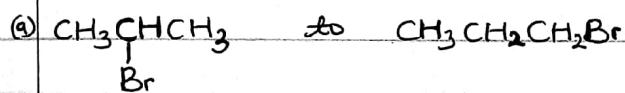
Solution:



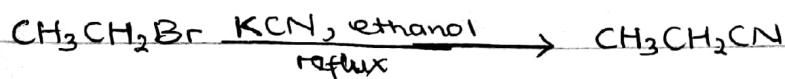
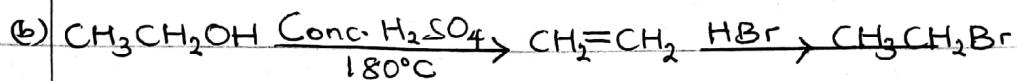
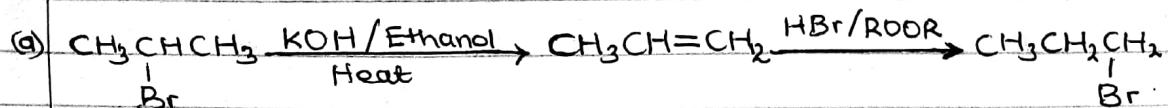




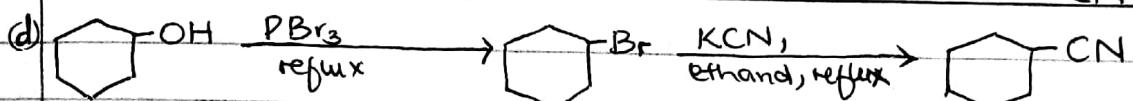
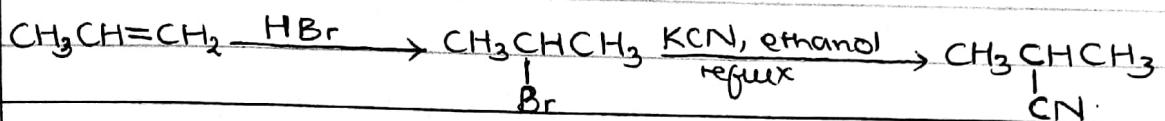
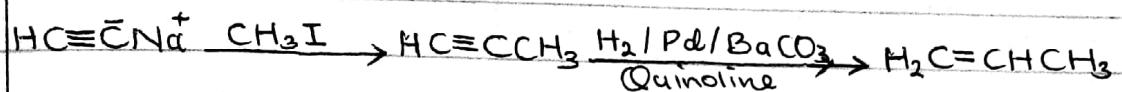
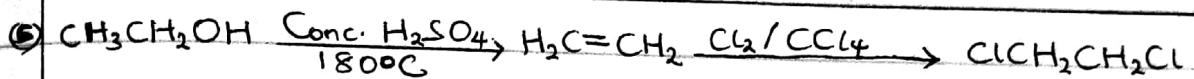
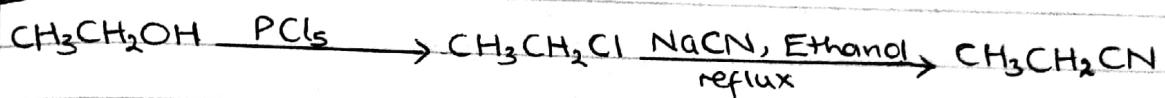
9. Write equations to show how the following compounds can be synthesised. In each case, state the conditions for the reactions.



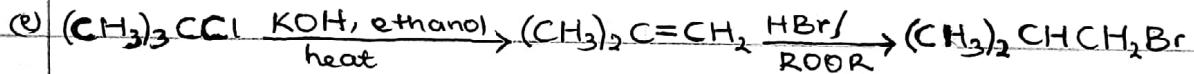
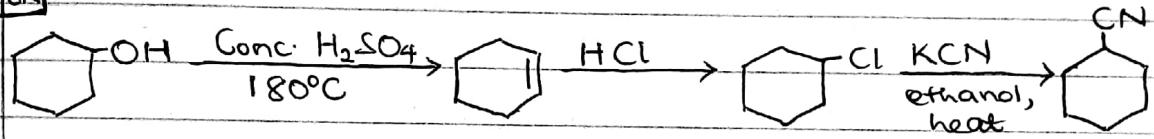
Solution:



Q8



Q10



10 Write equations to show how the following compounds can be synthesised. Indicate the conditions for the reaction in each case.

(a) Ethanoic acid to

(i) Ethane-1,2-diol

(ii) Bromoethane

(iii) Ethanol

(iv) Ethyne

(v) Methanal

(vi) Methanol

(vii) Chloromethane

(b) Chloroethane to:

- (i) Ethanoic acid
- (ii) Ethyne
- (iii) Ethanedioic acid
- (iv) Ethyl ethanoate

(c) Ethanal:

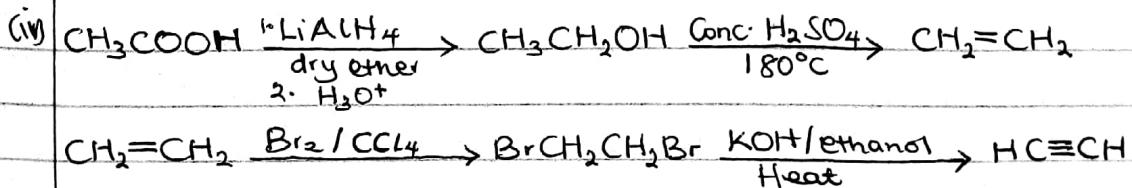
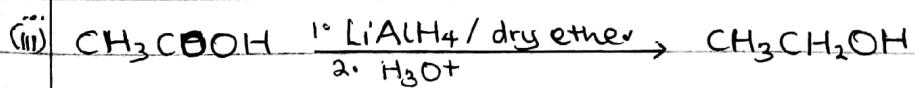
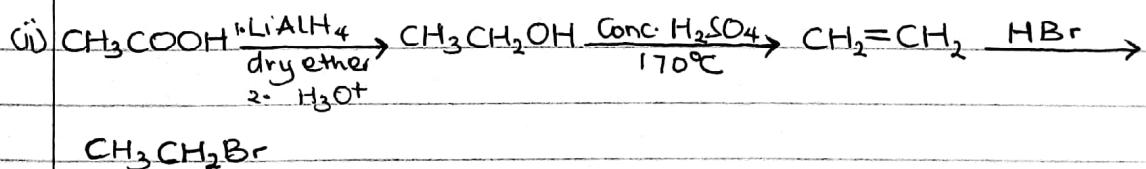
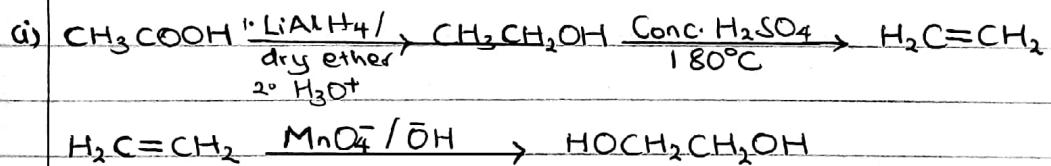
- (i) Ethane-1,2-diol

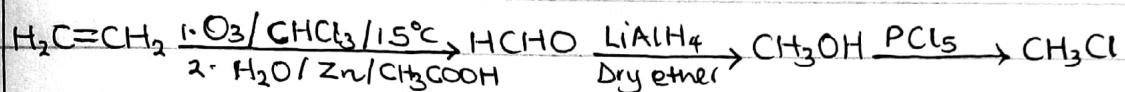
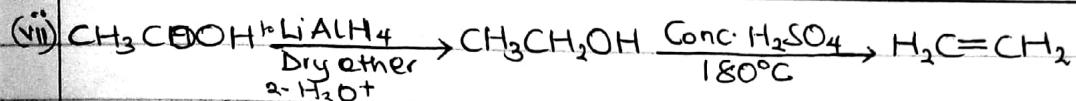
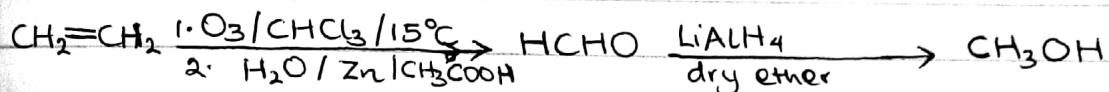
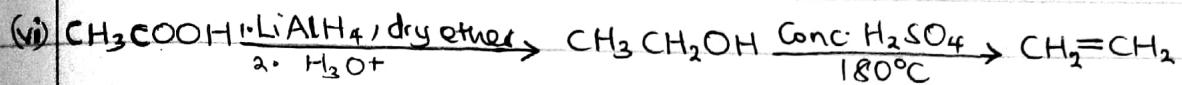
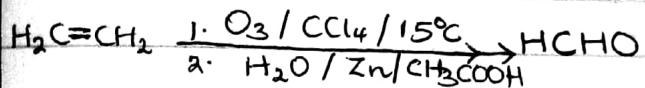
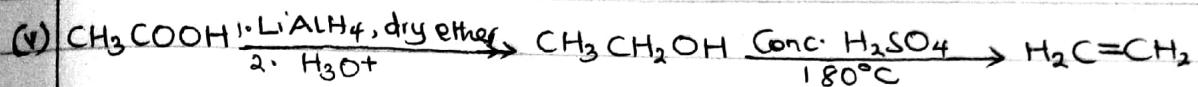
(d) Ethyne to

- (i) Phenylethanoic acid
 - (ii) Ethyl benzoate
 - (iii) Cyclohexanol
 - (iv) Propan-2-ol
- (v) Propan-1-ol
- (vi) Propane-1,2-diol

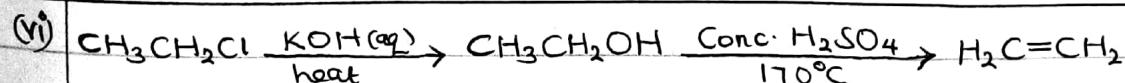
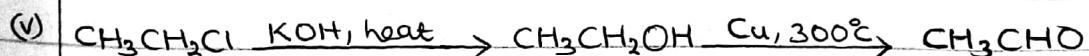
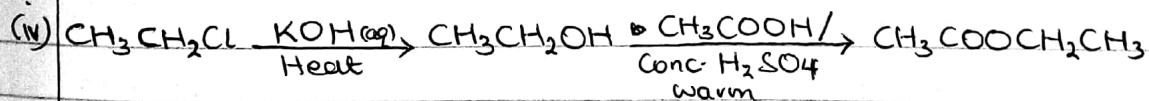
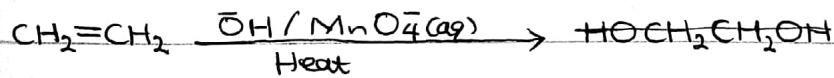
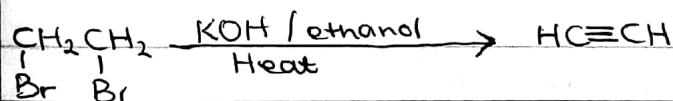
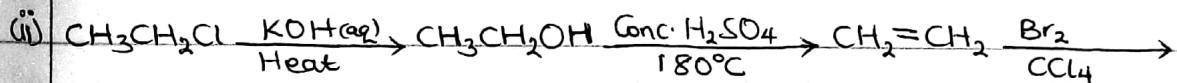
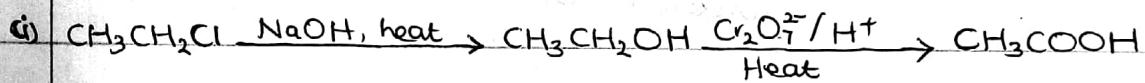
Solution:

(a)

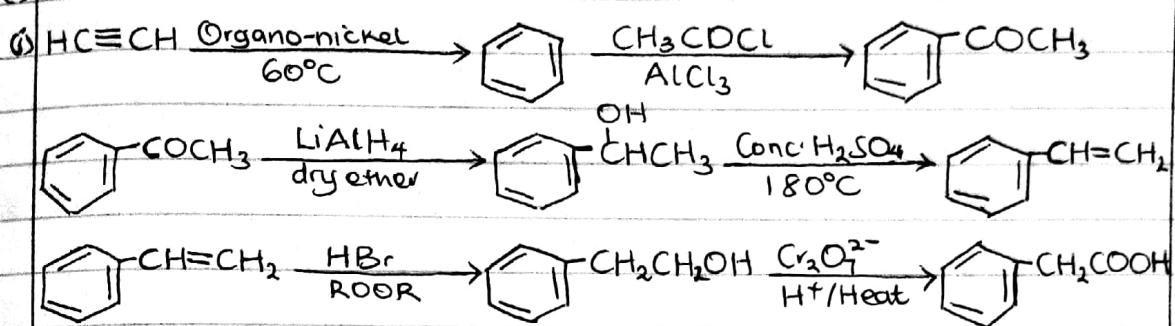




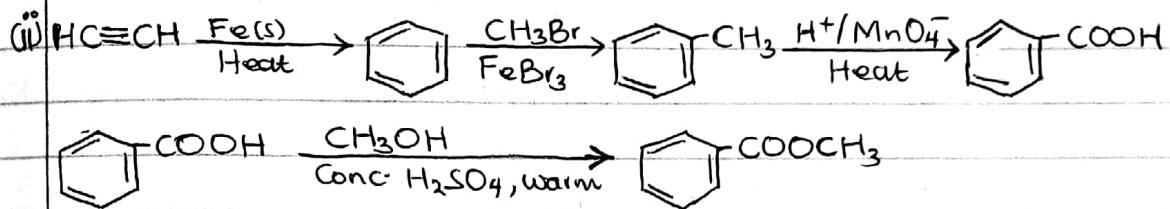
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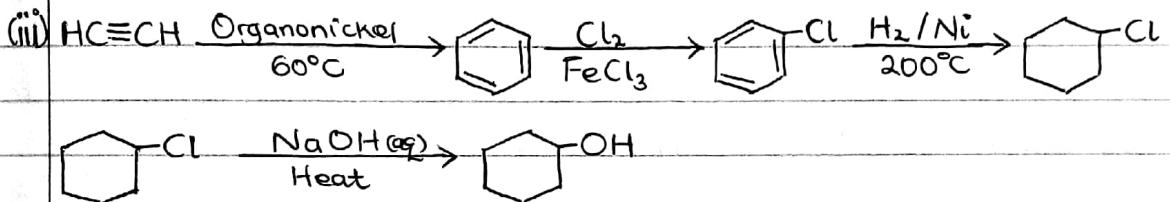
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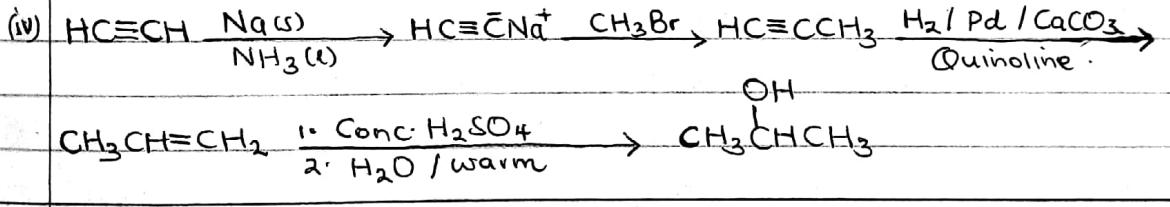
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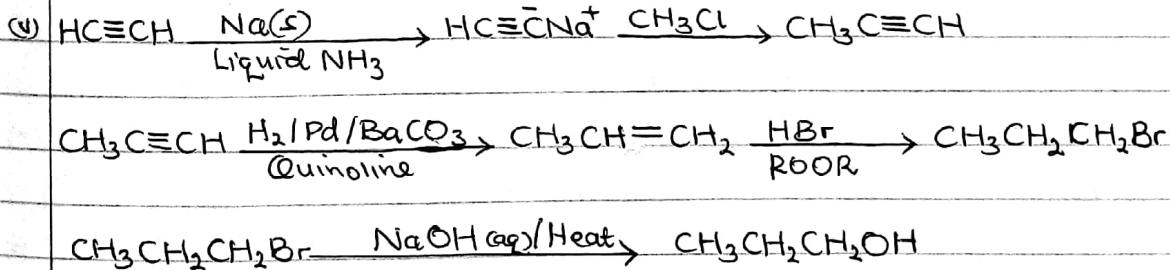
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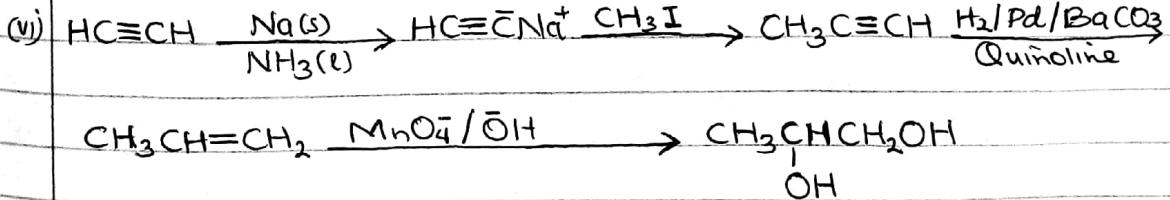
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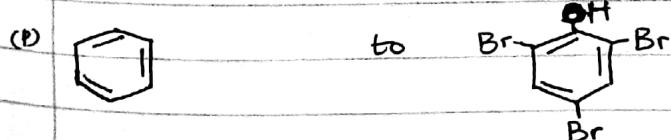
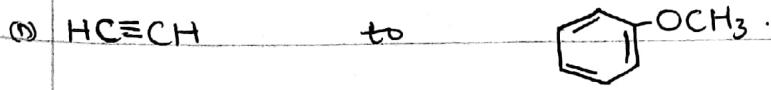
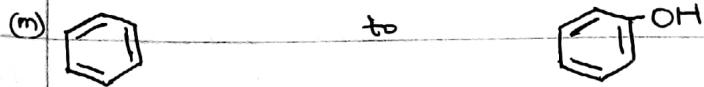
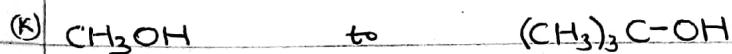
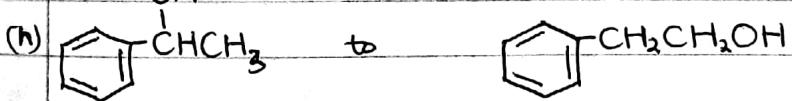
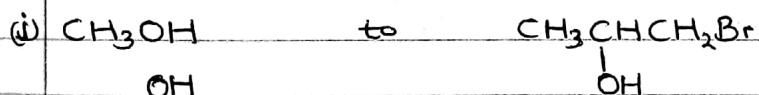
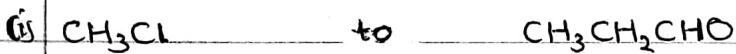
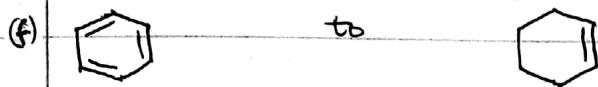
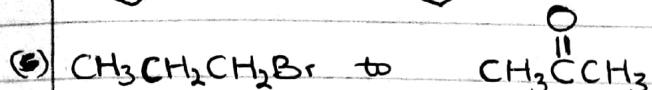
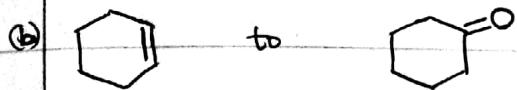
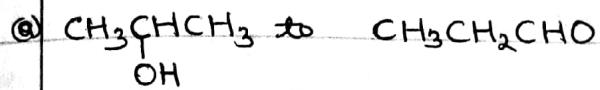
(v)



(vi)

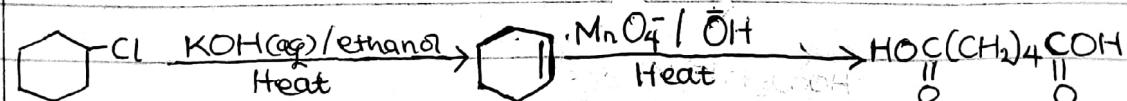
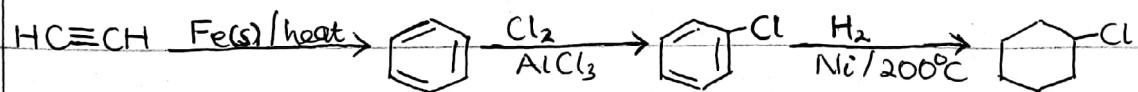
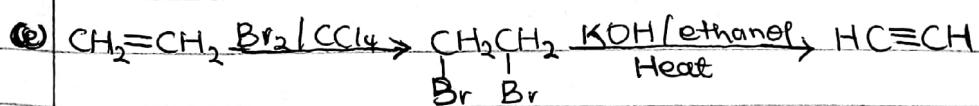
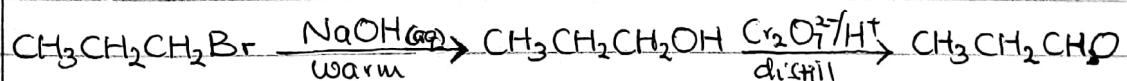
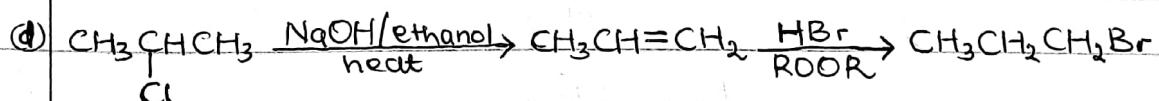
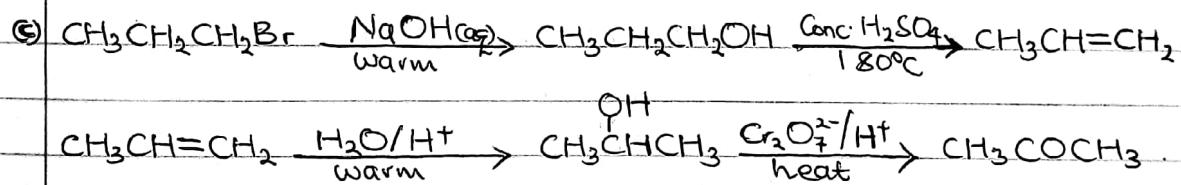
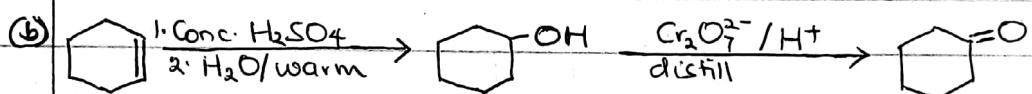
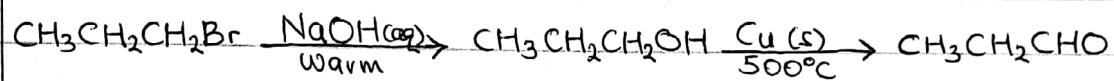
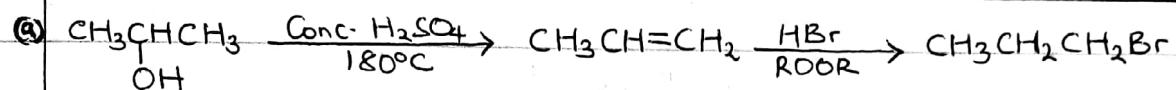


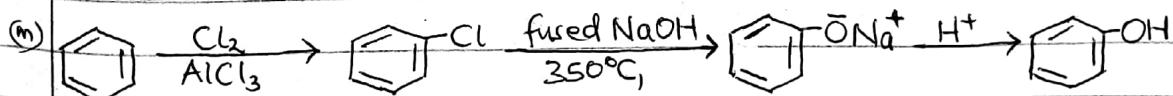
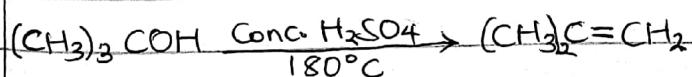
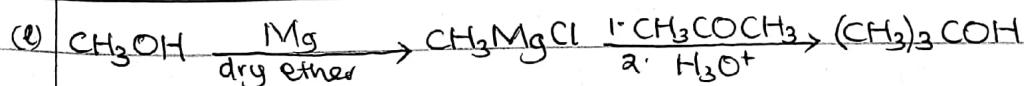
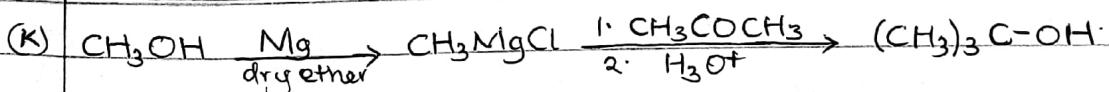
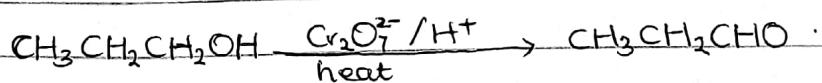
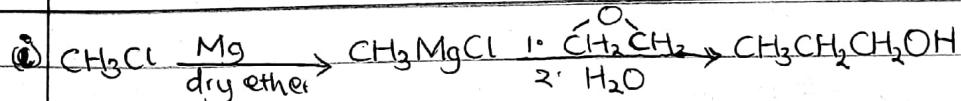
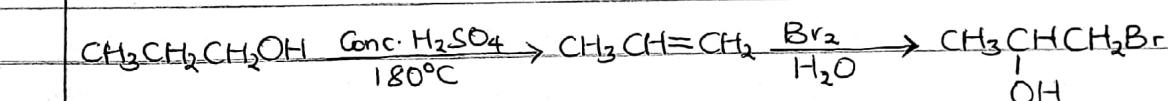
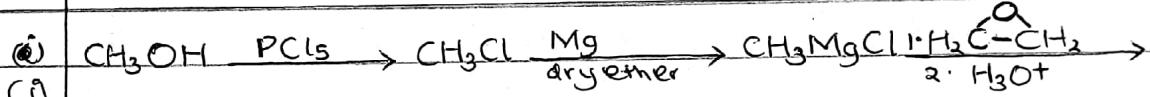
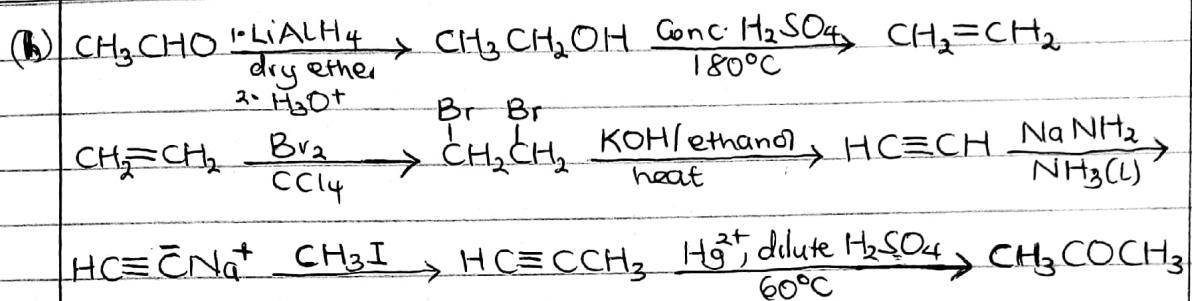
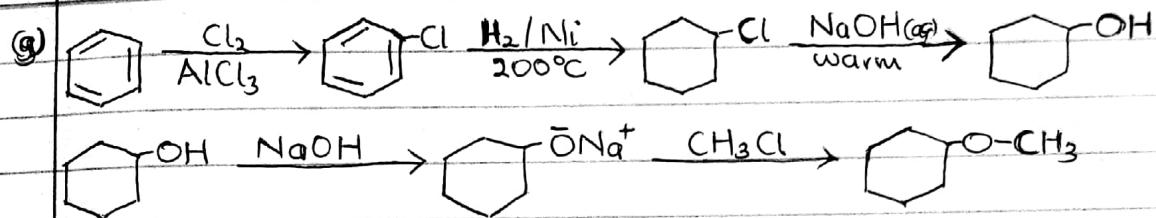
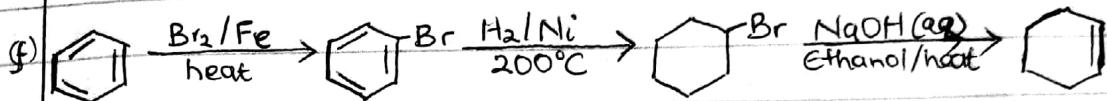
11 Write equations to show how the following compounds can be synthesised and in each case, state the conditions for the reaction.



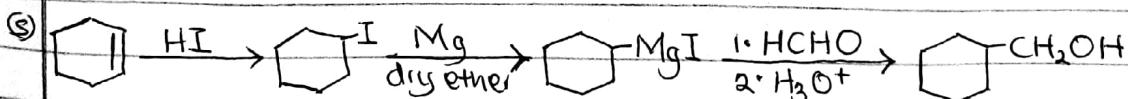
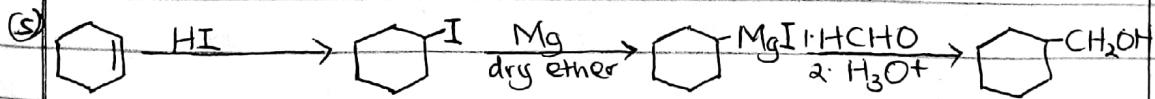
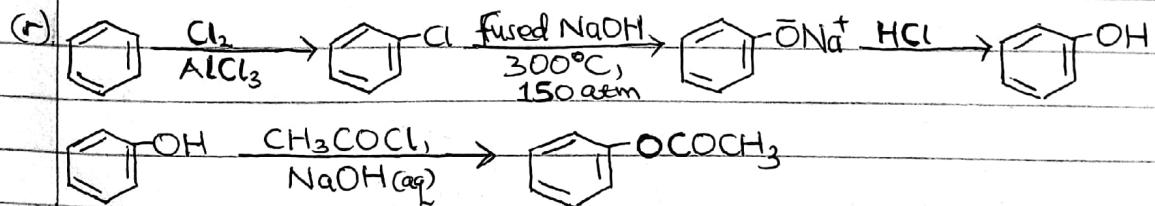
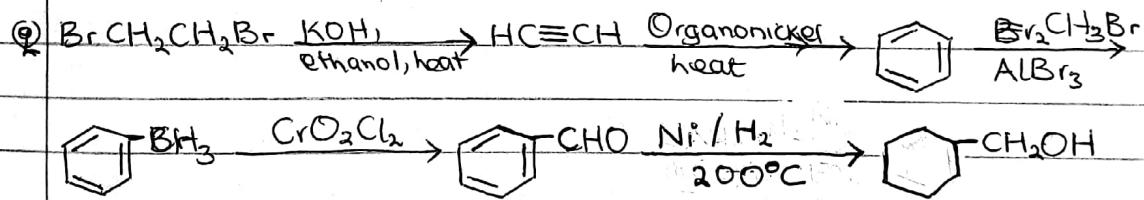
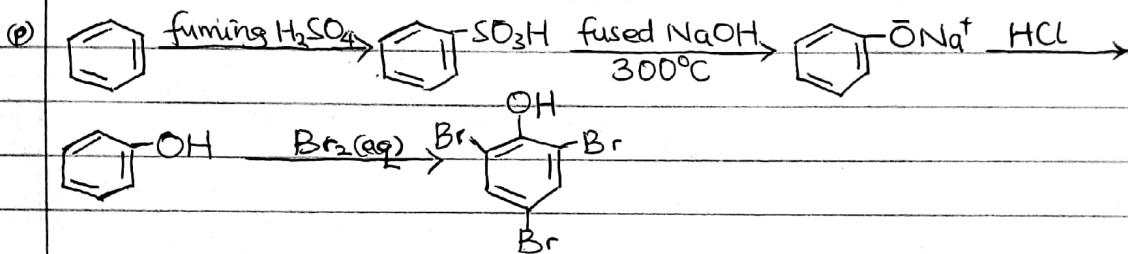
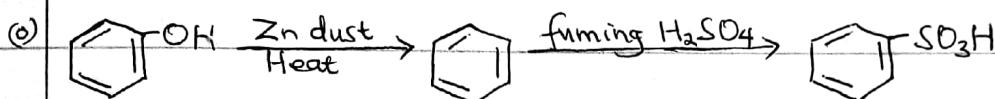
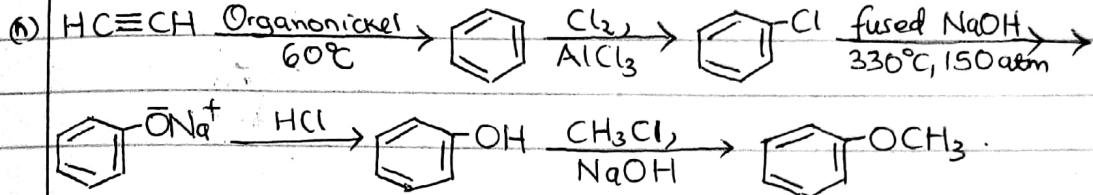
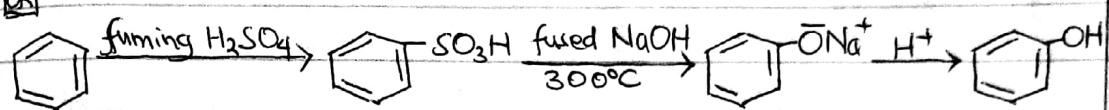


Solution:



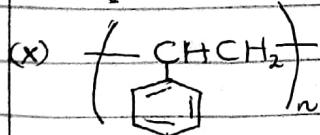
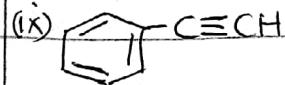
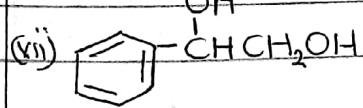
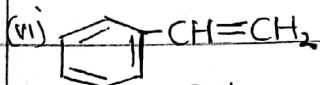
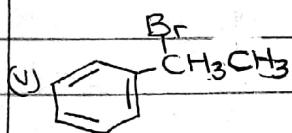
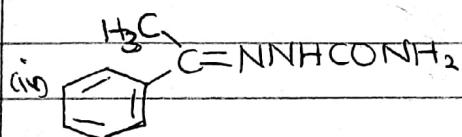
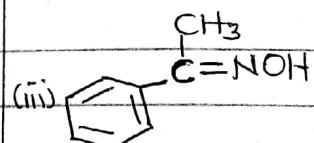
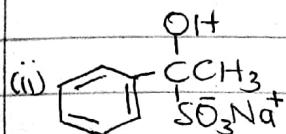
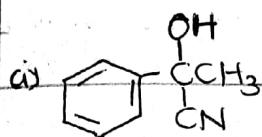


Q1

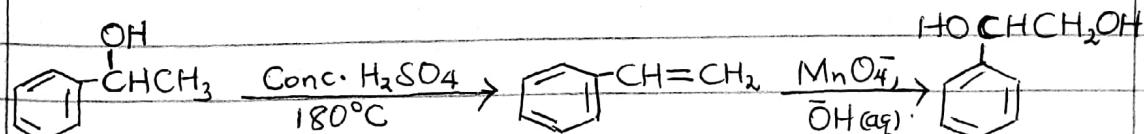
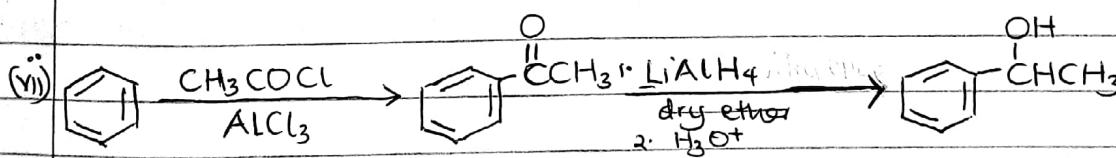
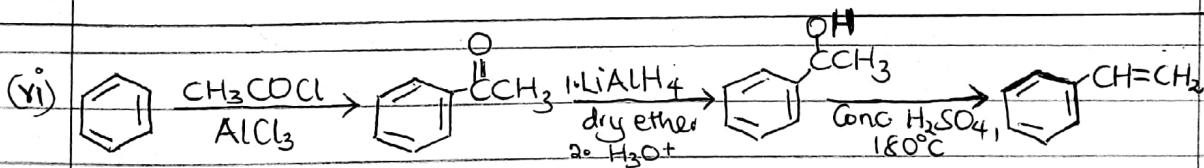
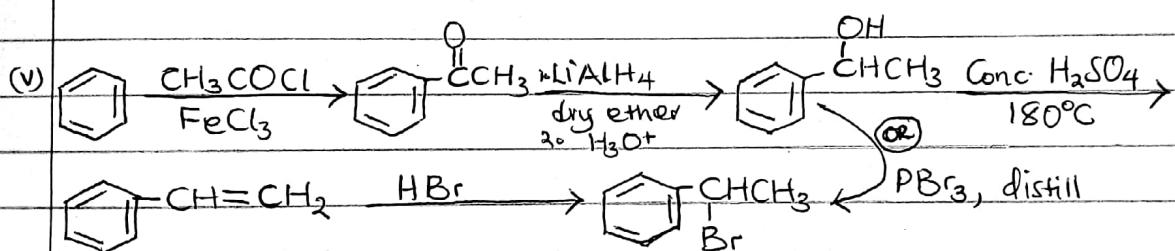
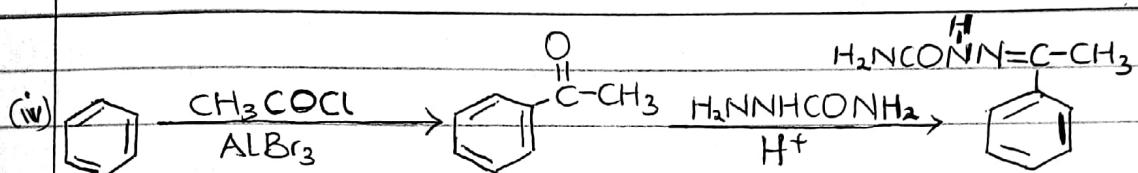
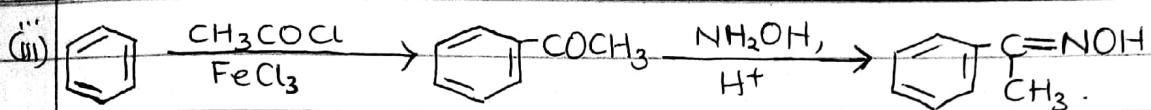
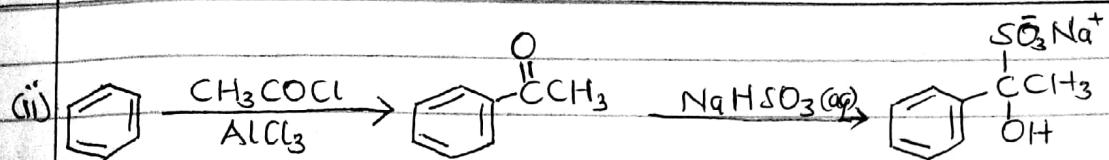
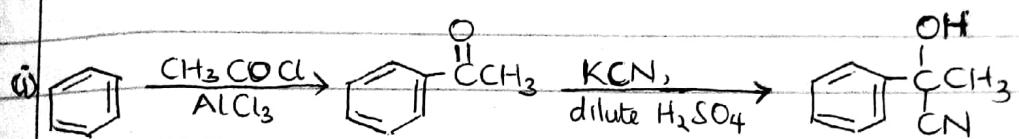


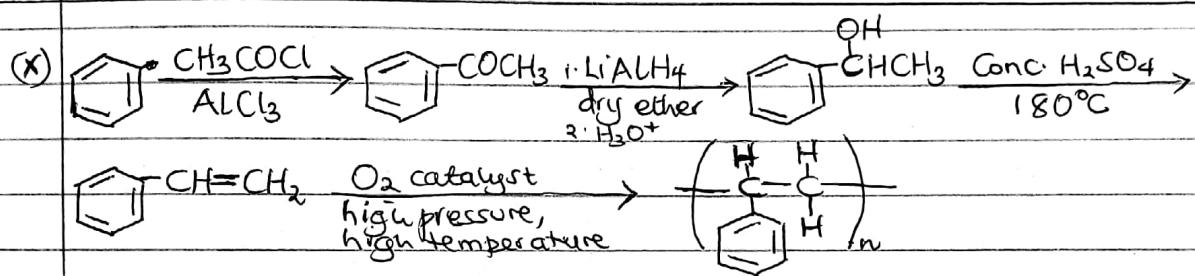
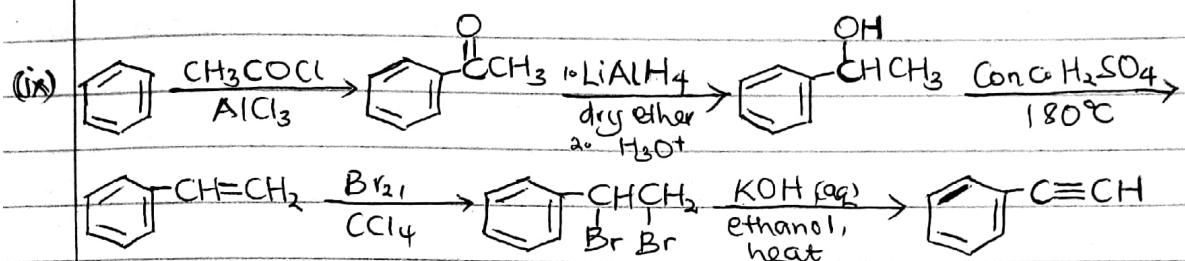
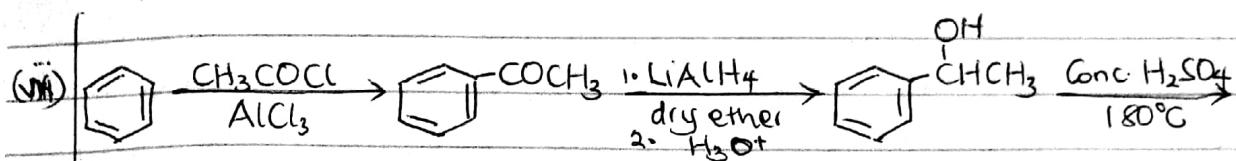
12 Write equations to show how the following compounds can be synthesised, And in each case, state the conditions for the reactions.

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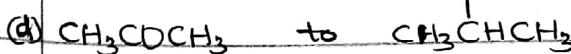
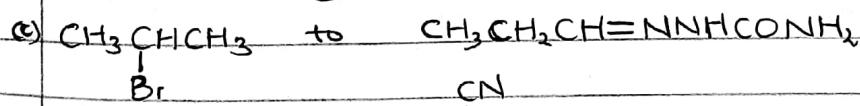
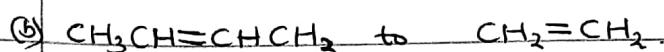
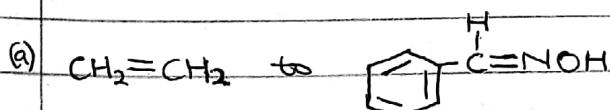


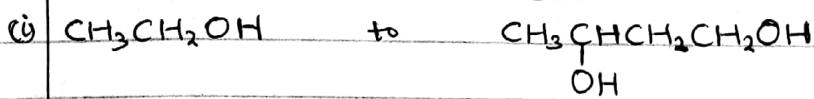
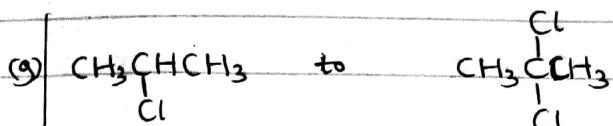
Solutions .



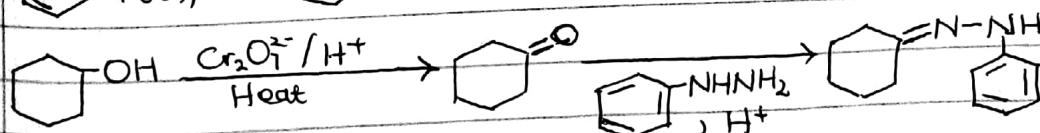
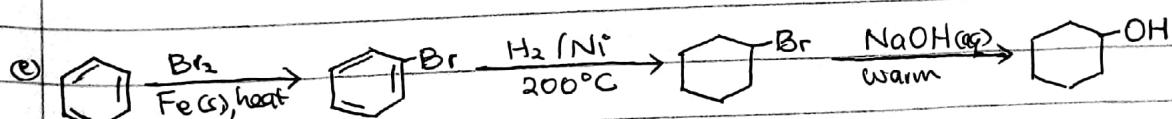
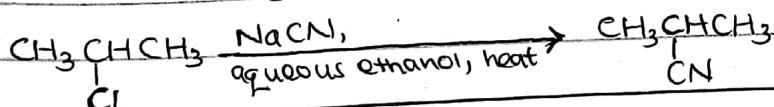
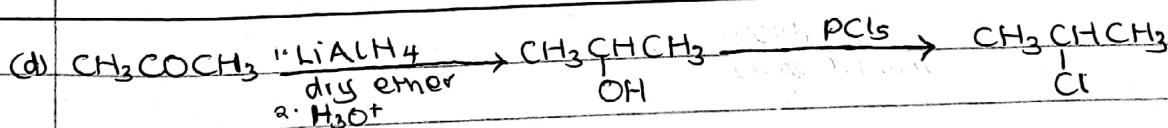
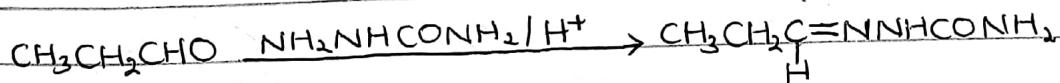
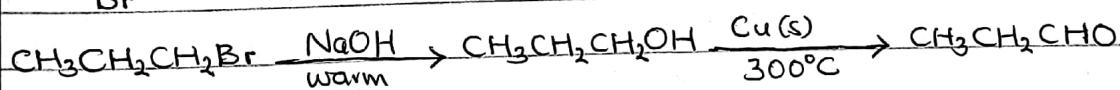
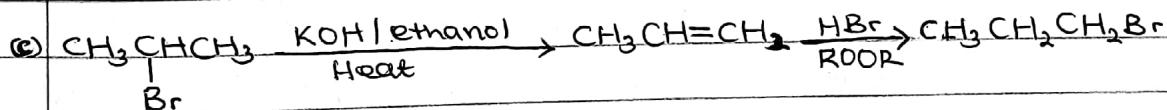
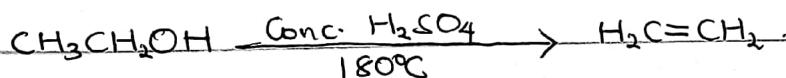
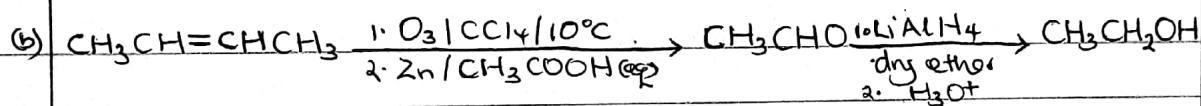
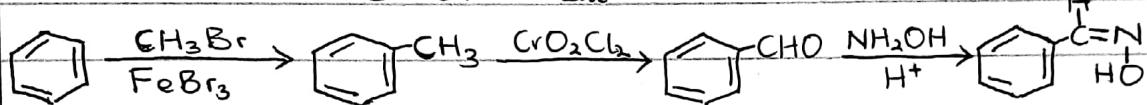
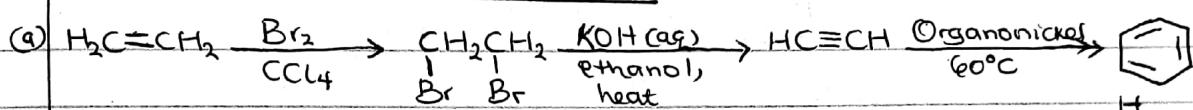


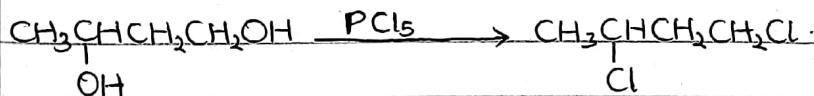
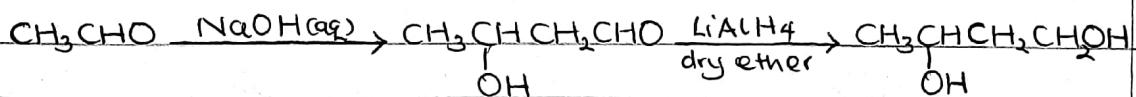
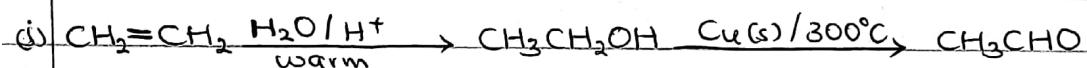
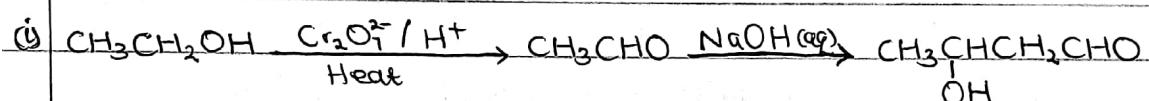
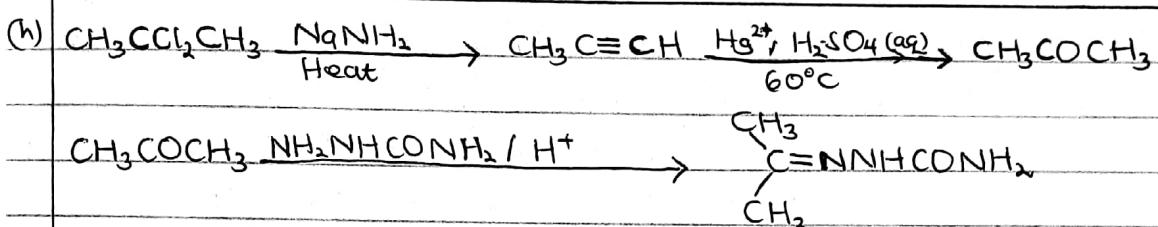
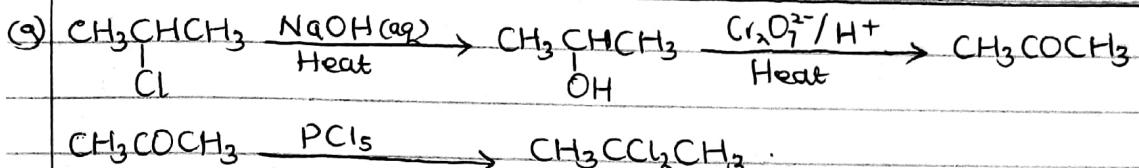
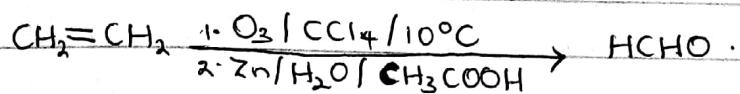
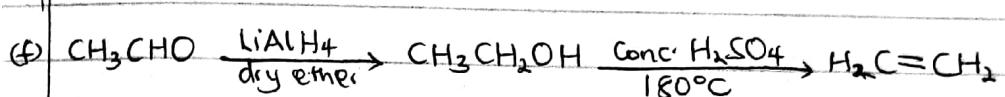
13 Write equations to show how the following compounds can be synthesised and in each case state the conditions for the reactions.





(k) Solution:





14 Write equations to show how the following compounds can be synthesised and in each case, state the conditions for the reactions

(a) Ethene to

(i) Ethanoyl chloride

(ii) Ethanoic acid

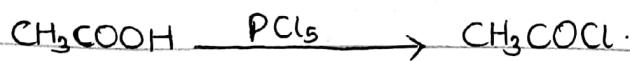
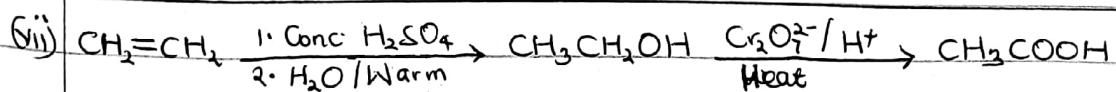
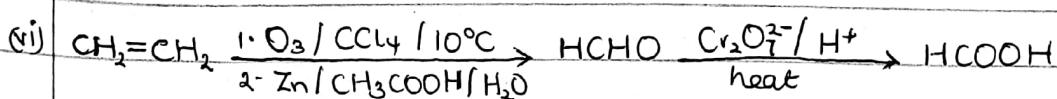
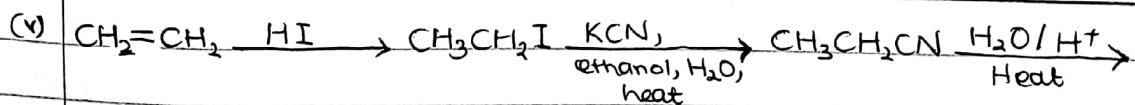
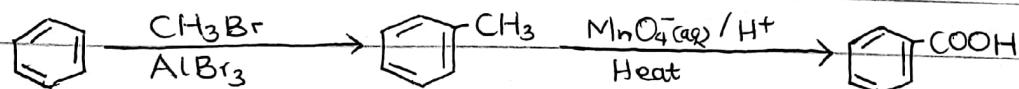
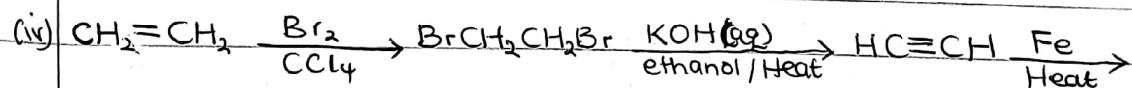
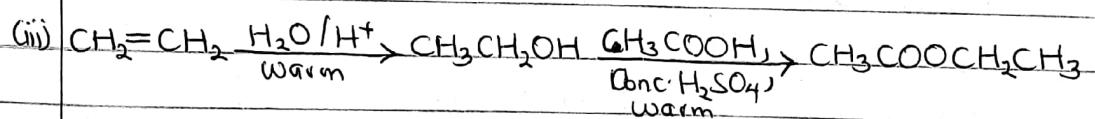
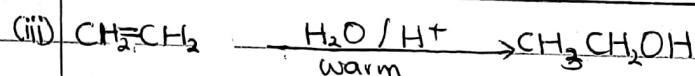
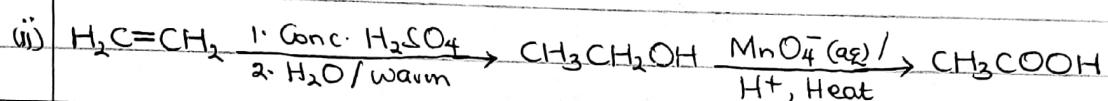
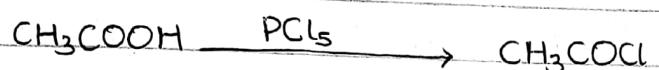
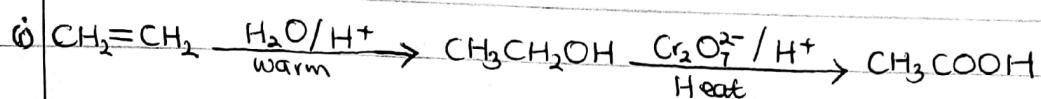
(iii) Ethyl ethanoate

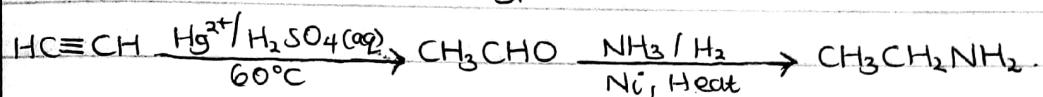
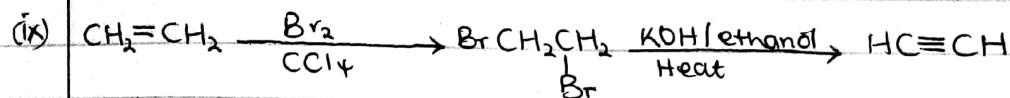
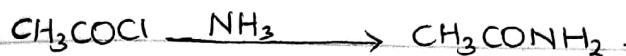
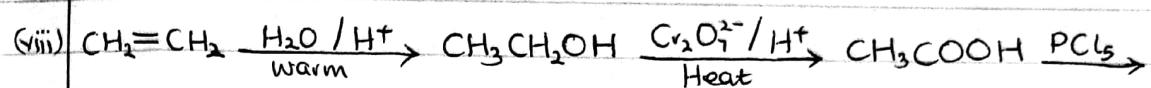
(iv) Benzene acid

(v) Propanoic acid

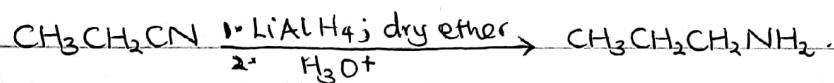
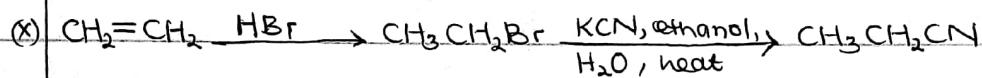
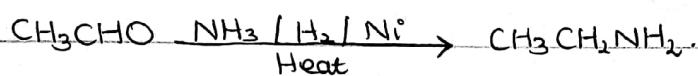
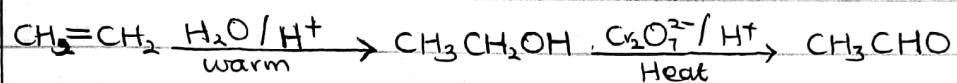
- (vi) Methanoic acid
- (vii) Ethanamide
- (viii) Ethanamine
- (ix) Propanamine

Solution:





Q8



1-

15 Write equations to show how the following compounds can be synthesised from

(a) propene

(b) 2,2-dimethylpropanedioic acid

(c) Propan-2-amine

(d) Ethanamine

(e) 2-methylpropanoic acid

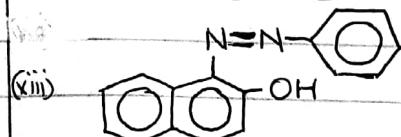
(f) 2-methylpropan-1-amine

(g) Nitrobenzene

(i) Phenylmethanamine

(ii) Benzoic acid

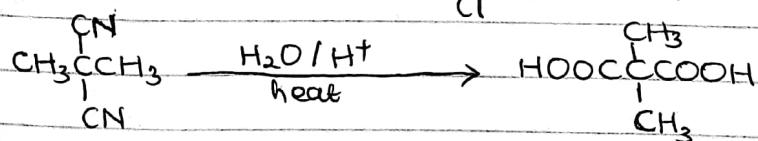
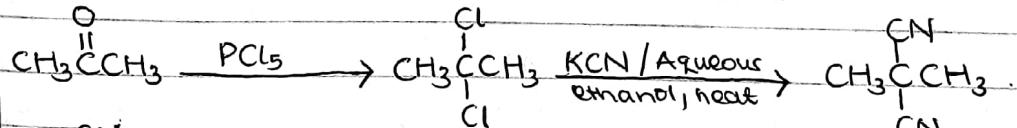
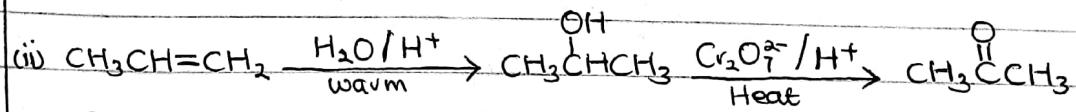
- (iii) Cyclohexanamine
 (iv) Methylbenzene
 (v) 3-phenylpropanoic acid
 (vi) 1,3,5-tribromobenzene
 (vii) 4-hydroxyazobenzene

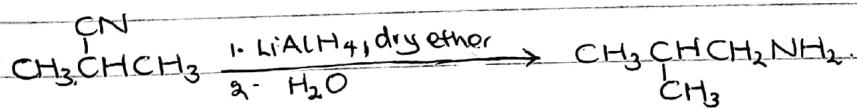
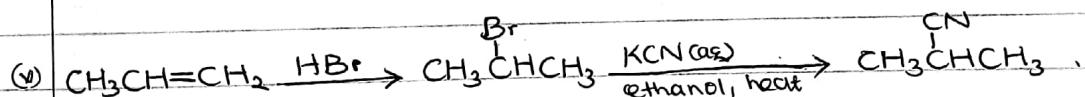
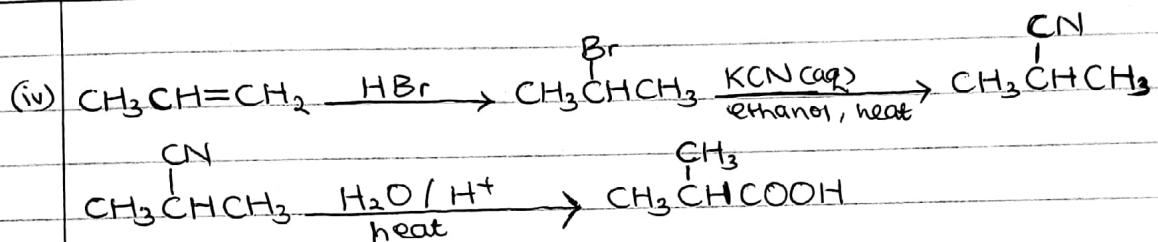
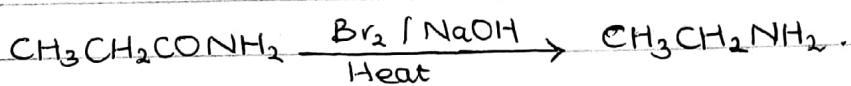
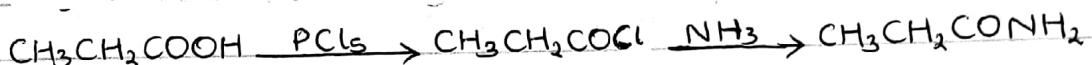
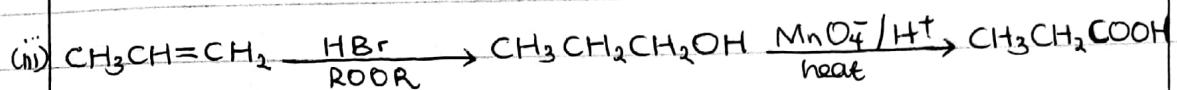
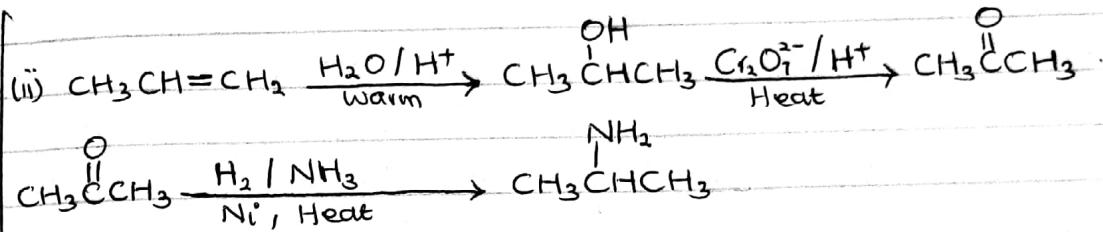


- (c) Methylbenzene
 (i) Iodobenzene
 (ii) 2-phenylethanol
 (iii) Phenol
 (iv) Phenylethanoic acid
 (v) Phenylmethanamine
 (vi) Cyclohexanamine
 (vii) Phenylamine

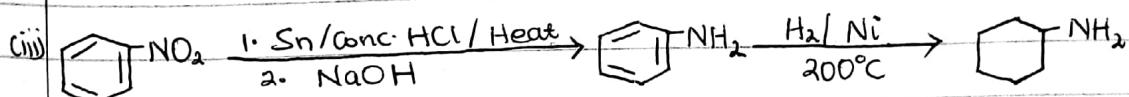
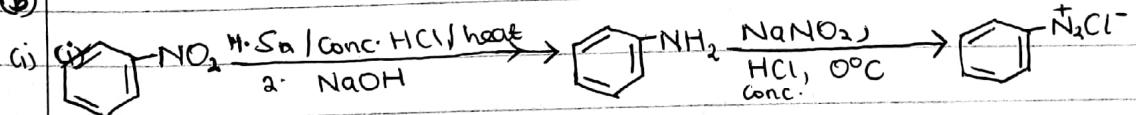
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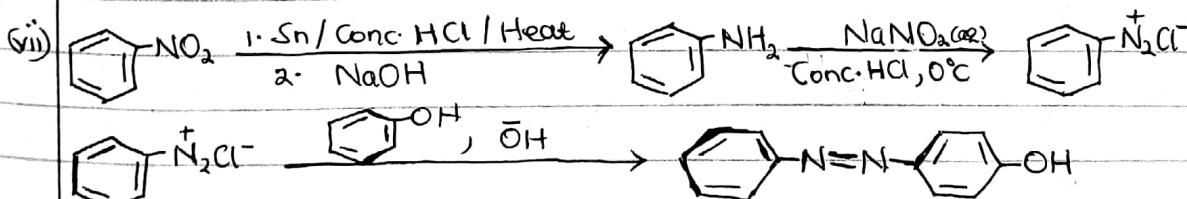
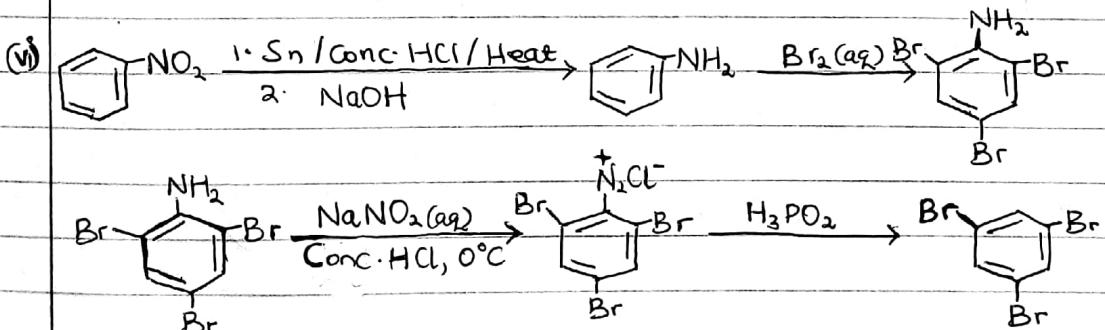
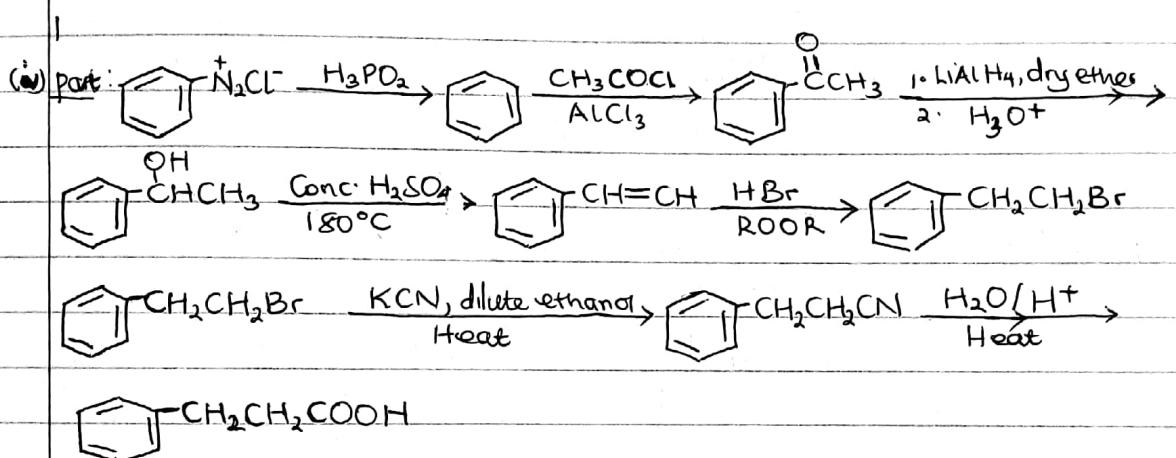
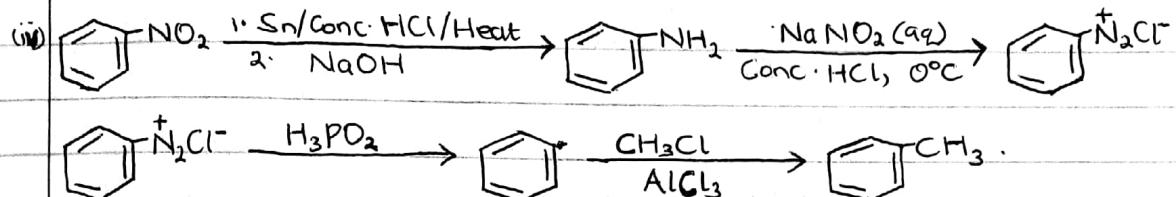
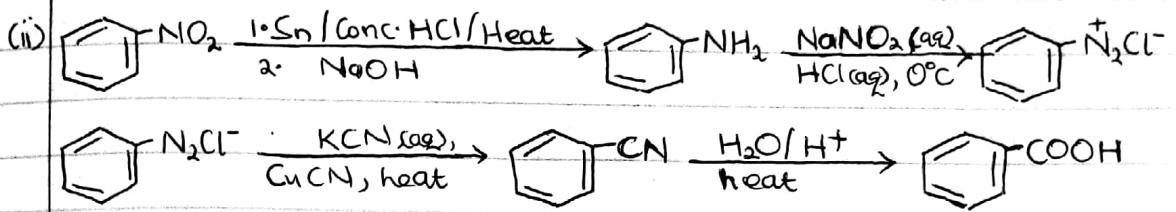
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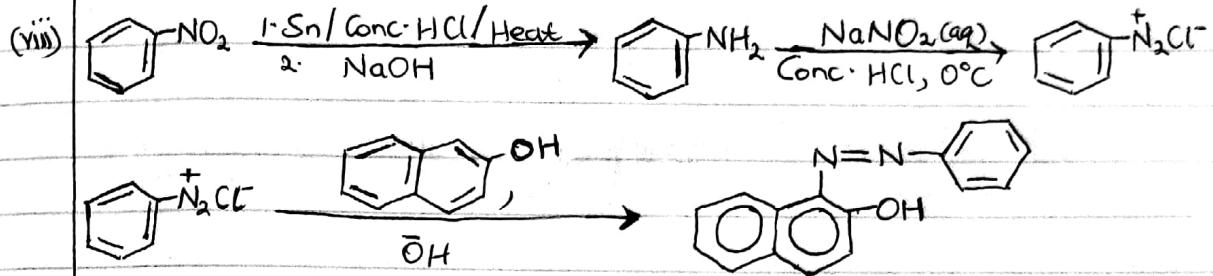




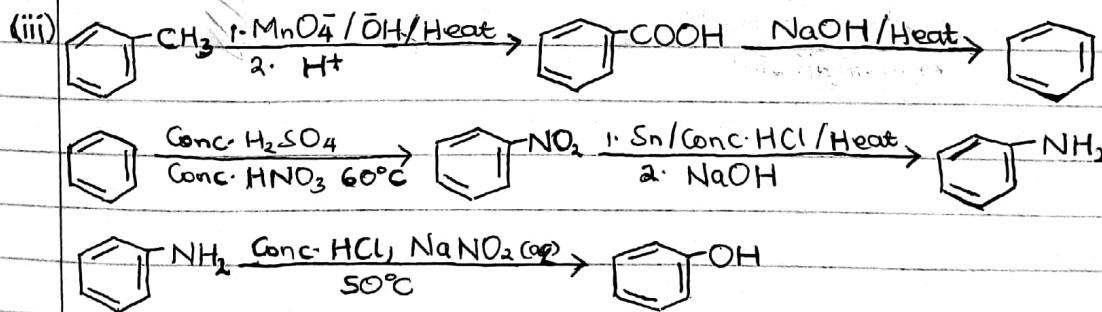
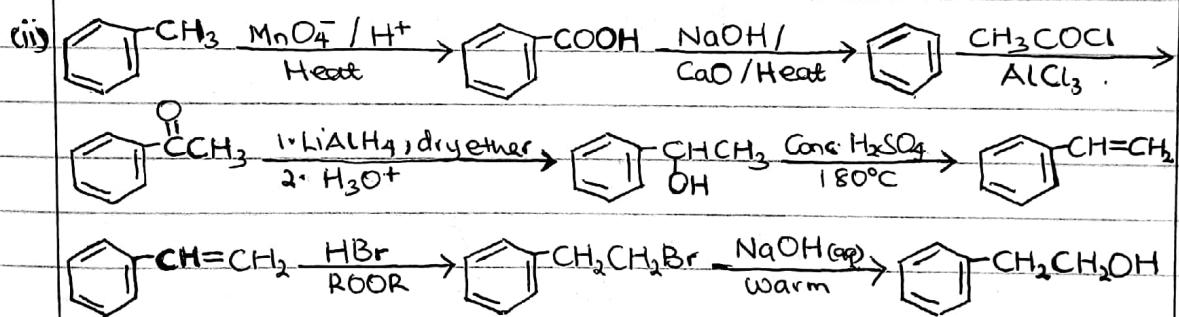
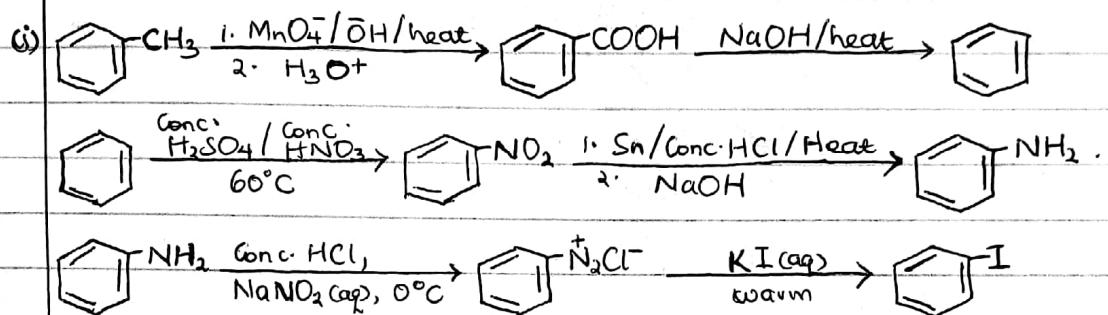
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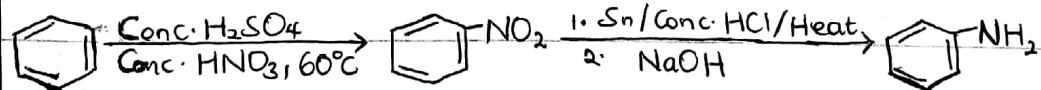
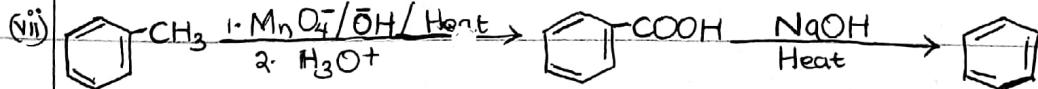
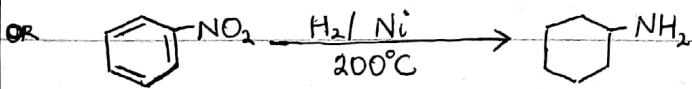
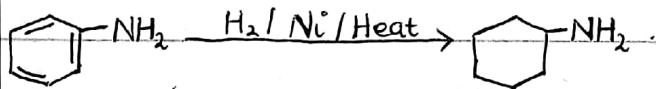
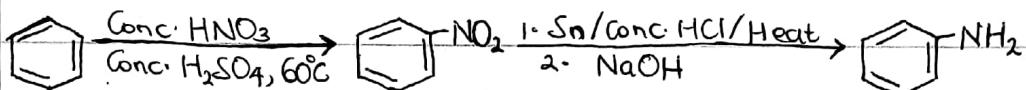
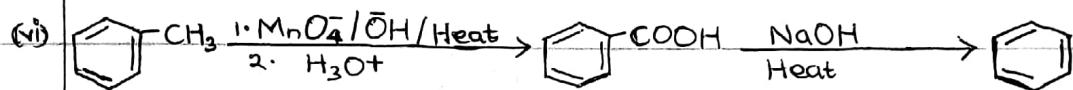
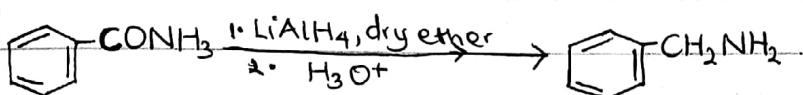
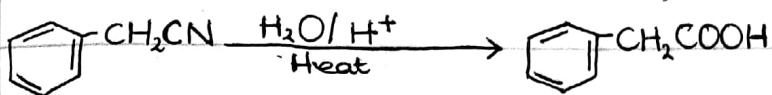
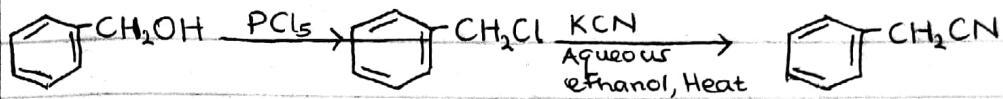
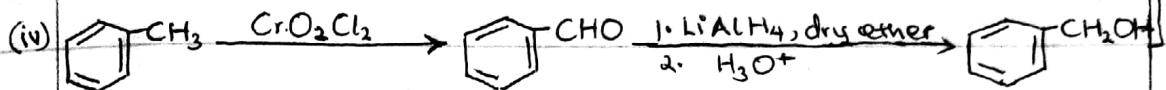






(c)





16 Write equations to show how the following compounds can be synthesised and in each case, state the conditions for the reactions.

(a) Benzene to N-methyl-N-phenylamine. (N-methylbenzylamine)

(b) Methyl benzoate from phenylmethanol.

(c) Benzene to propylbenzene.

(d) Aniline to 4-bromoaniline

(e) Cyclohexene from nitrobenzene

(f) Benzene to 2-Methylphenylethanoic acid

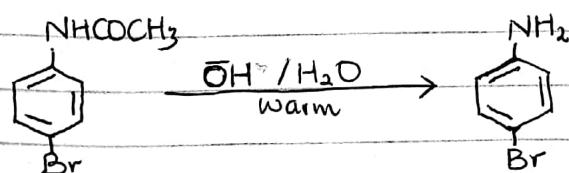
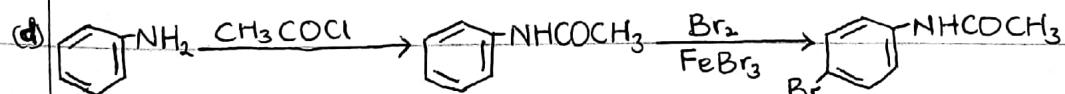
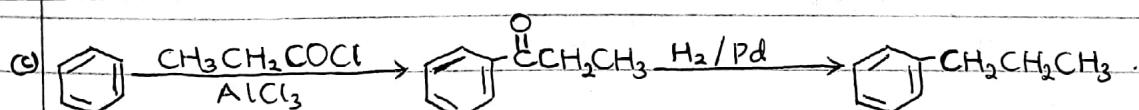
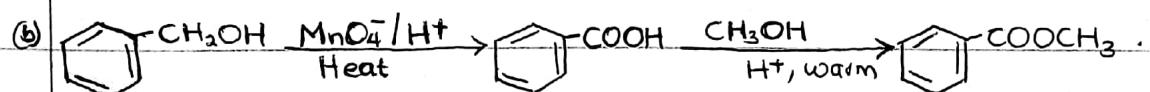
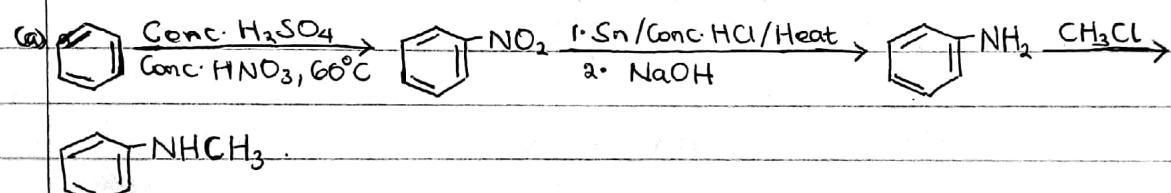
(g) Phenylethene to 2-methyl-2-phenylethanamine.

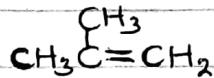
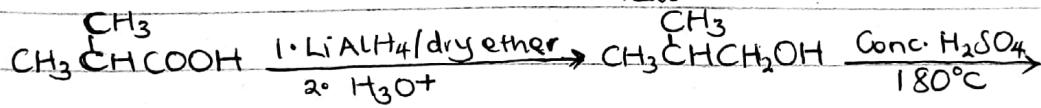
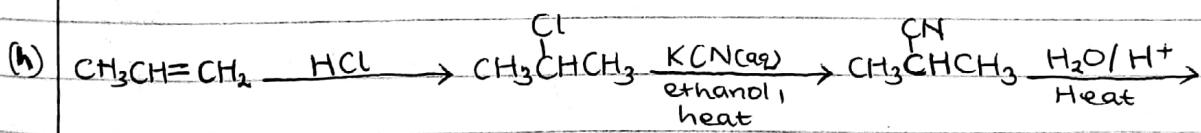
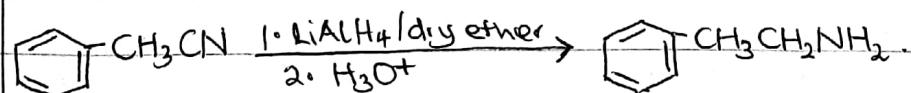
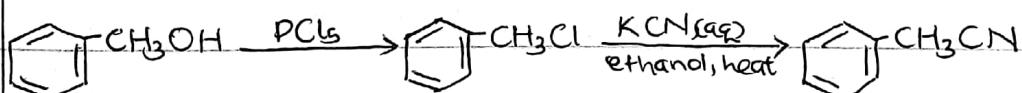
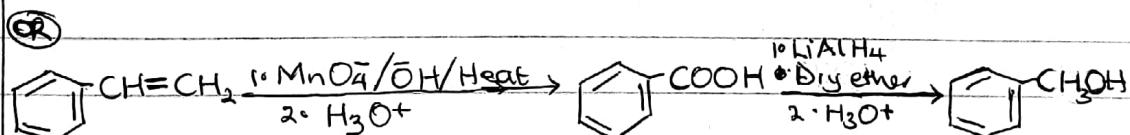
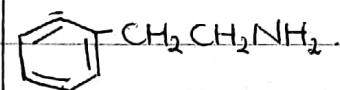
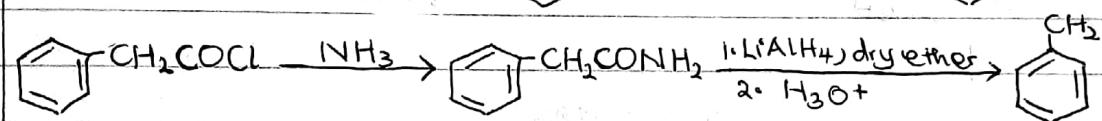
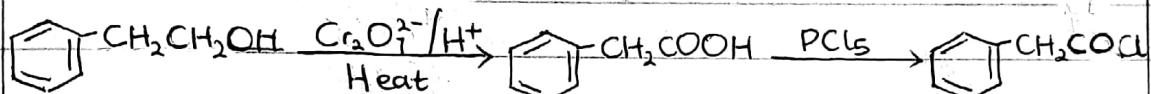
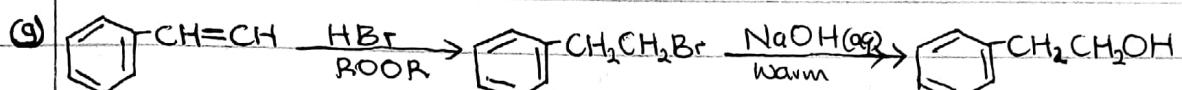
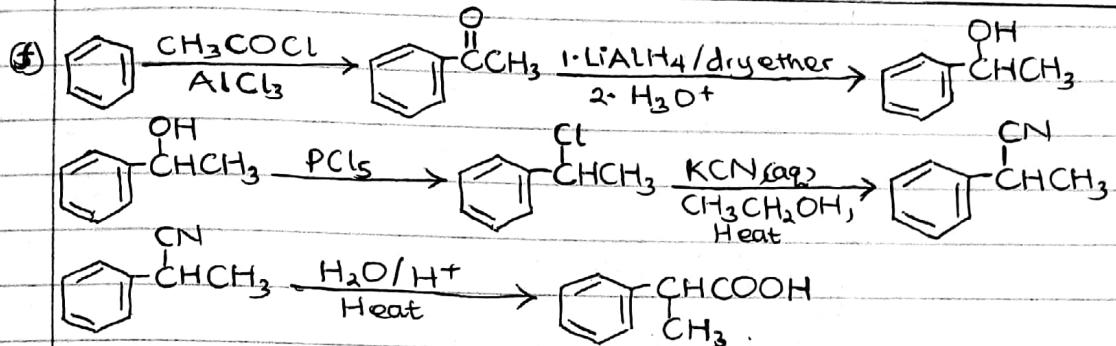
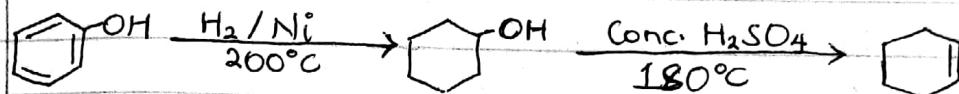
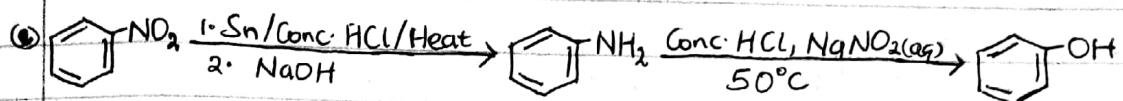
(h) Propene to 2-methylpropene

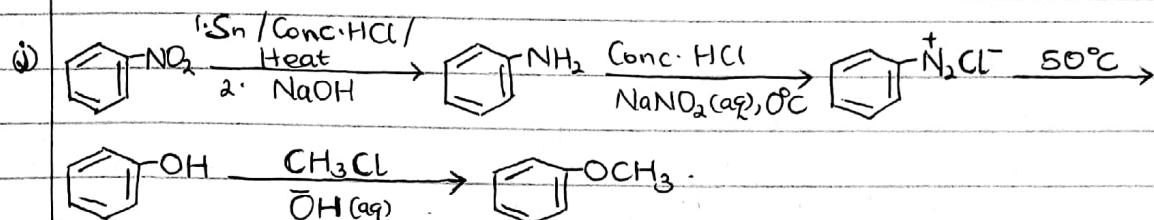
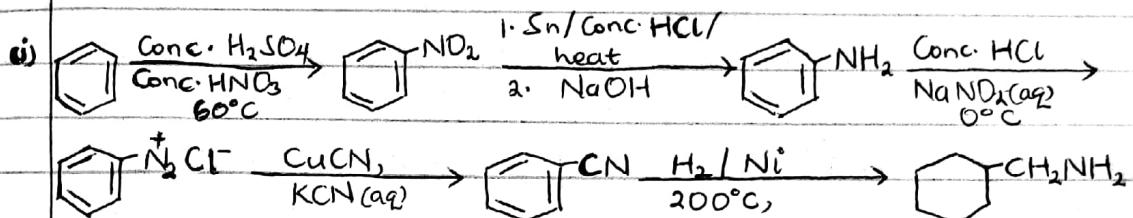
(i) Benzene to Cyclohexylmethanamine

(j) Nitrobenzene to methyl phenyl ether (methoxybenzene)

Solution



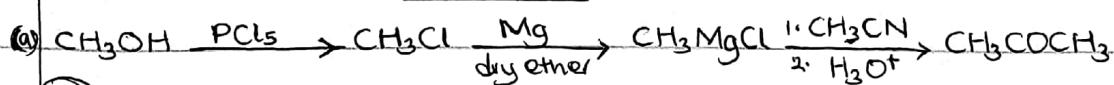




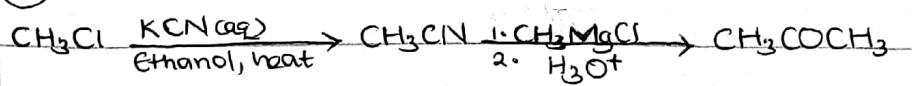
17 Write equations to show how the following compounds can be synthesised and in each case, state the conditions for the reaction.

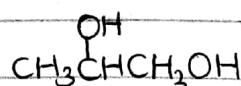
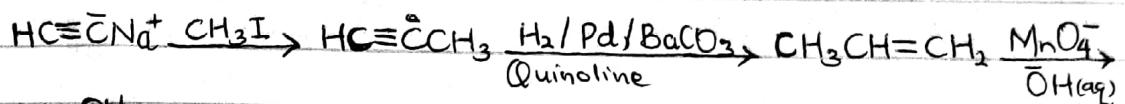
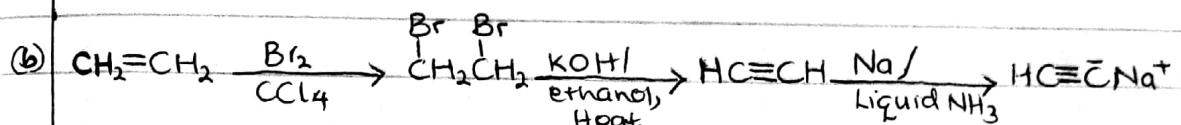
- Propanone from methanol
- Ethene to propane-1,2-diol
- Chlorobenzene to (chloromethyl)benzene
- (Bromomethyl)benzene to 2-phenylethanol
- Phenol to cyclohexylmethanol
- Cyclohexane-1,2-diol from Aniline
- Benzanamine to 1-amino-2-phenylpropan-2-ol
- Benzene to phenylpropanedioic acid
- Chloroethane to 1,1-dichloroethane
- Phenol to phenylethene

Solution:

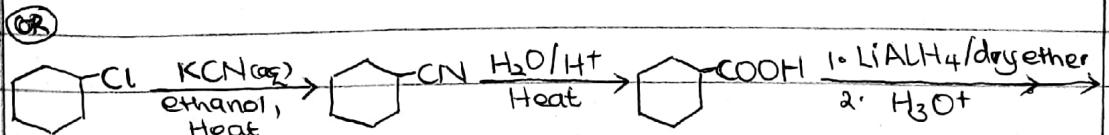
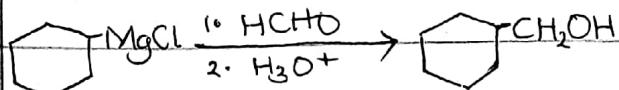
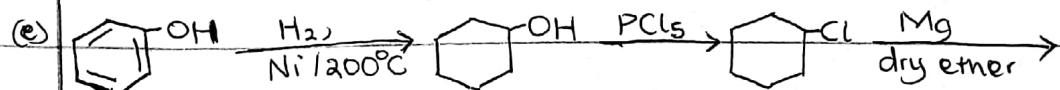
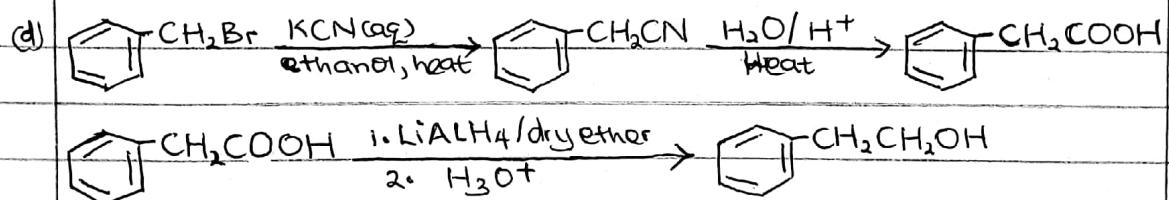
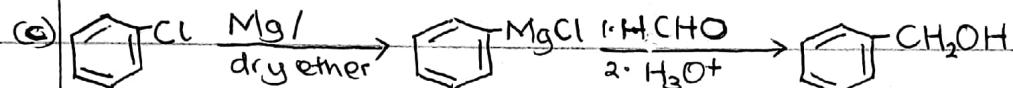
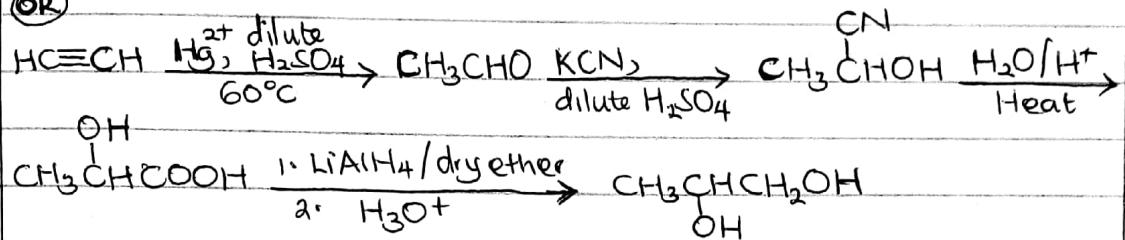


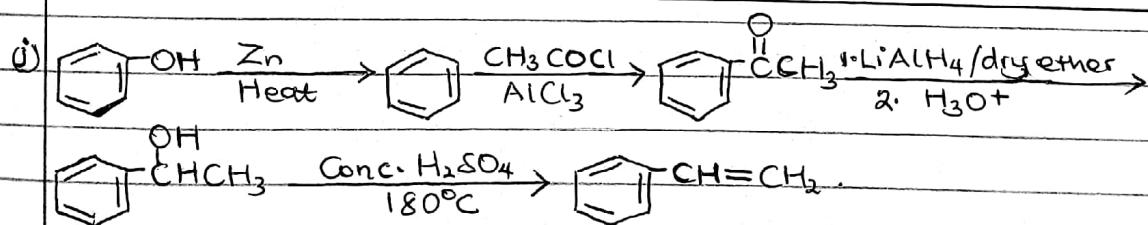
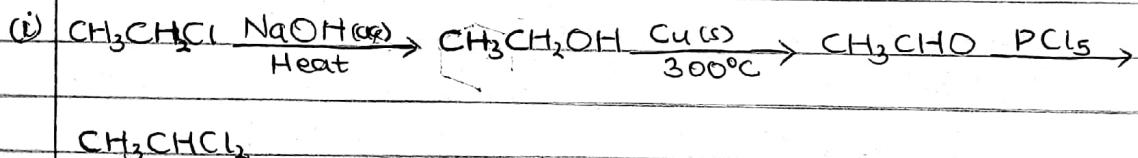
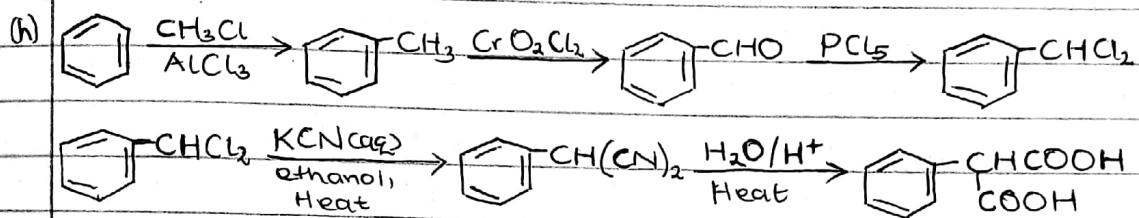
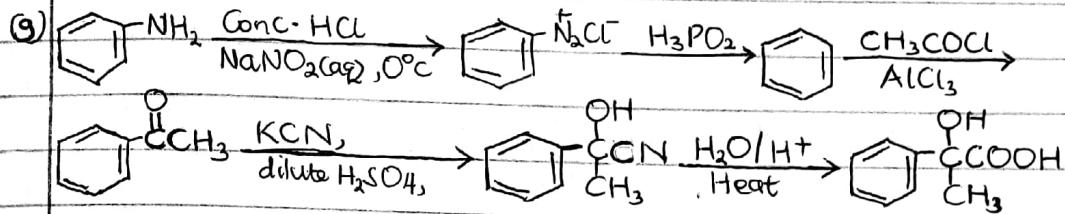
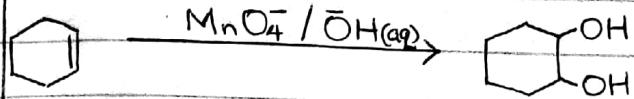
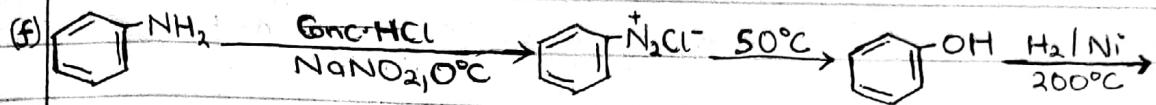
(b)





(c) OR





18 Write equations to show how the following conversions can be made and in each case, state the conditions for the reactions.

- 1-Chloropropane to ethanamine
- N-Methylmethanamine from ethanol
- 1,2-dibromoethane to ethanamide
- Ethyne to cyclohexane carboxylic acid

(e) Methylbenzene to cyclohexylmethanamine

(f) Methylbenzene to Cyclohexanamine.

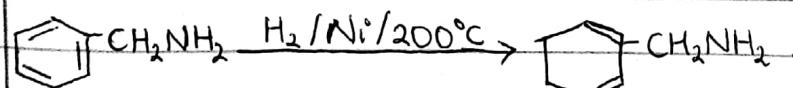
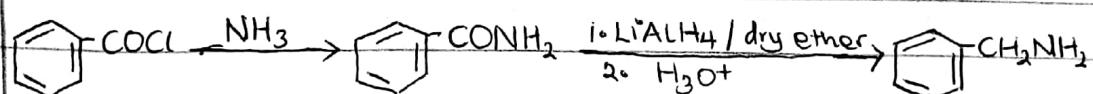
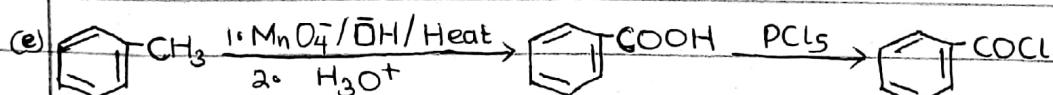
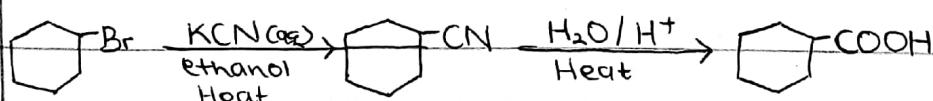
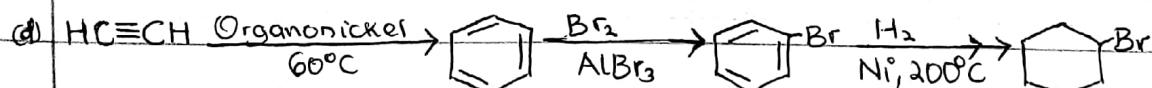
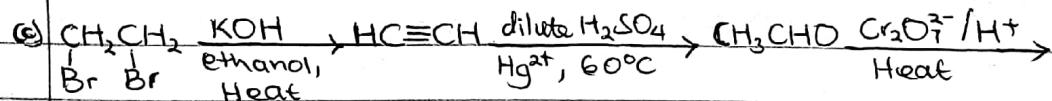
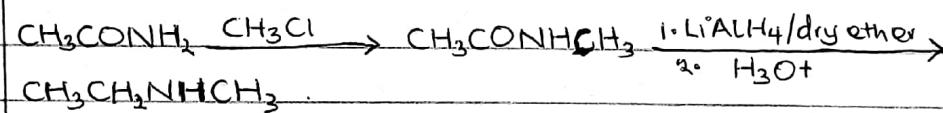
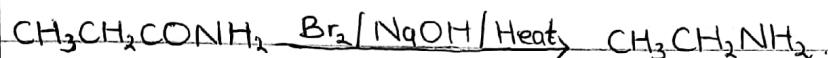
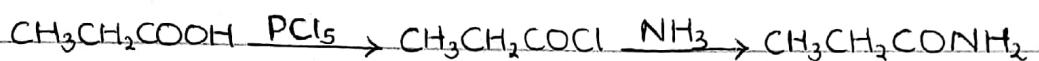
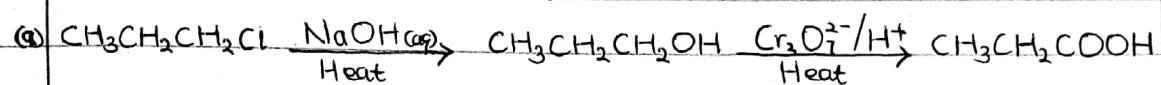
(g) Methanol to 2-methylpropene

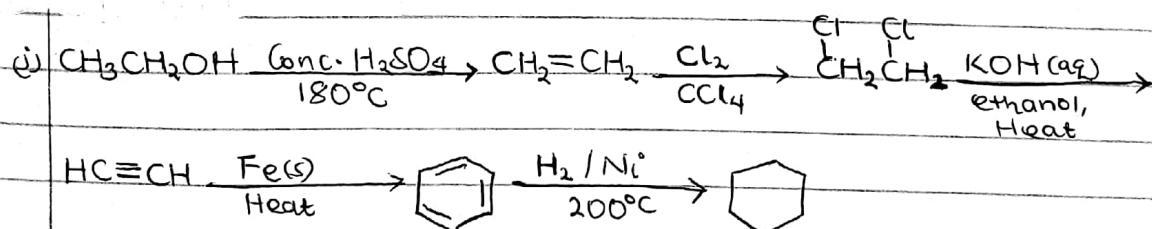
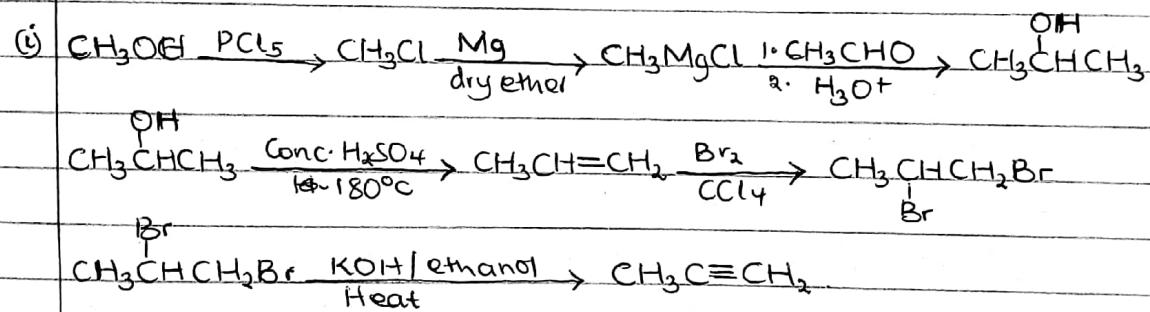
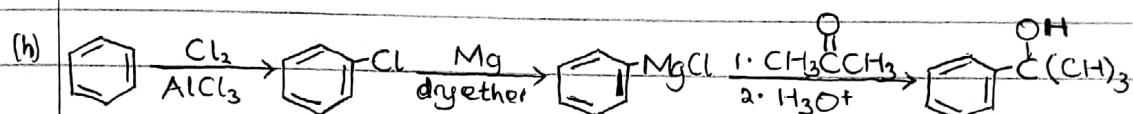
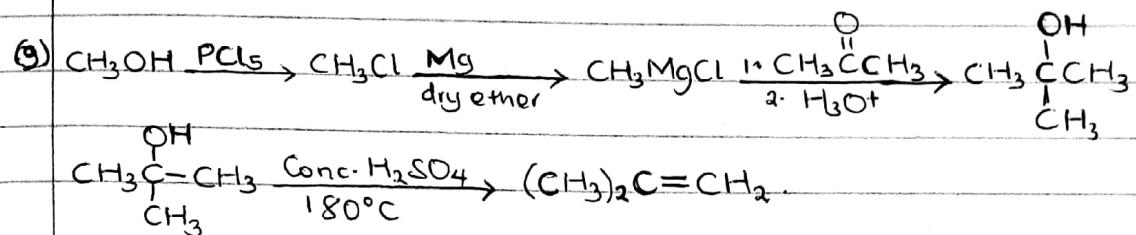
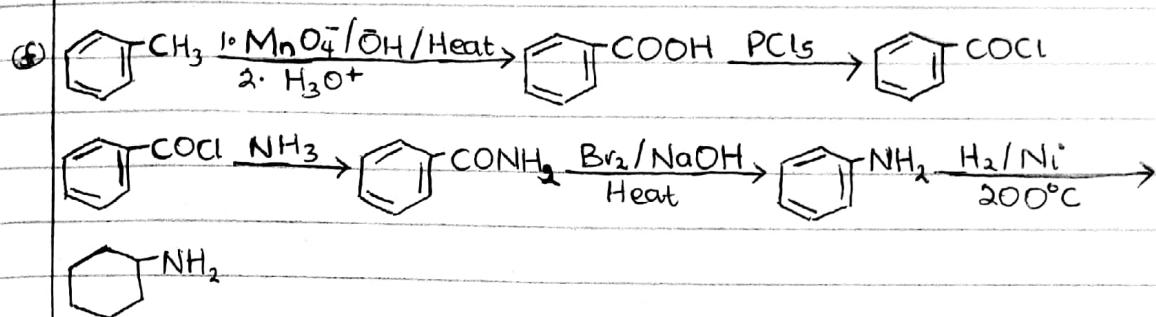
(h) Benzene to 2-phenylpropan-2-ol

(i) Methanol to Propyne

(j) Ethanol to Cyclohexane.

Solution:





THE SYNTHESIS
OF
ORGANIC COMPOUNDS

S. SEKTEJWE · A. RONALD

~~THE~~ 2016

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