Answer Key

IB Chemistry Organic Rxns Review Wksht

Alkane Rxns

1. a) $C_3H_8(g) + O_2^{(g)} \rightarrow 3CO_2^{(g)} + 4H_2O(g)$

conditions: excess O_2, source of ignition

b) $2C_4H_{10}(g) + 9O_2^{(g)} \rightarrow 8CO(g) + 10H_2O(g)$

conditions: limited O_2, source of ignition

c) $C_2H_6(g) + O_2(g) \rightarrow 2C(s) + 3H_2O(g)$

conditions: very limited O_2, source of ignition

2. a) $CH_4(g) + Cl_2(g) \rightarrow CH_3Cl(g) + HCl(g)$

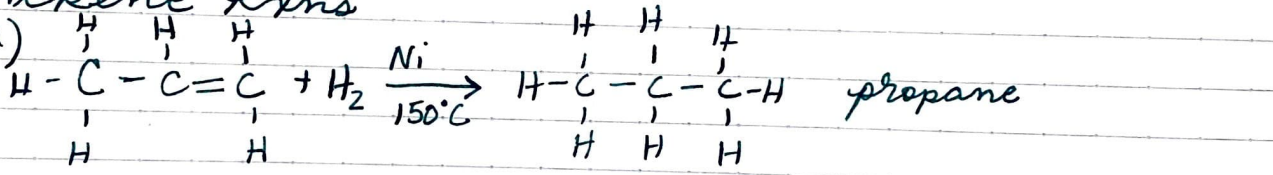
- homolytic fission
- chloromethane (CH_3Cl)

conditions: UV light

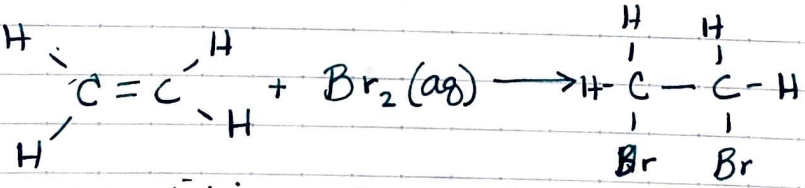
b) $C_2H_6(g) + Br_2(g) \rightarrow C_2H_5Br(l) + HBr(g)$

conditions: UV ~~to~~ light

Alkene Rxns

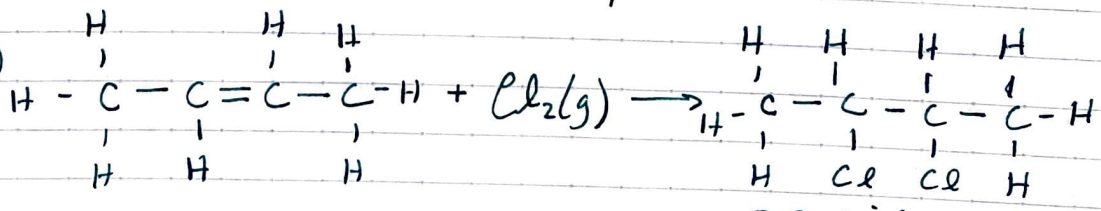
3. a) 

propane

4. a) 

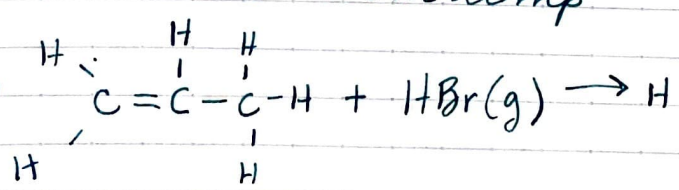
1,2 dibromoethane

conditions: room temp

b) 

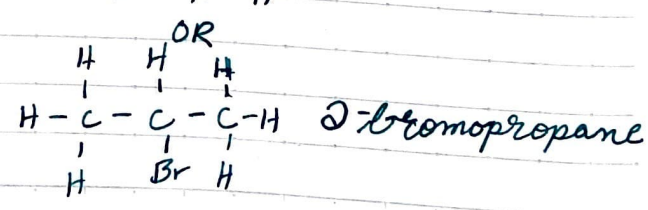
2,3 dichlorobutane

conditions: room temp

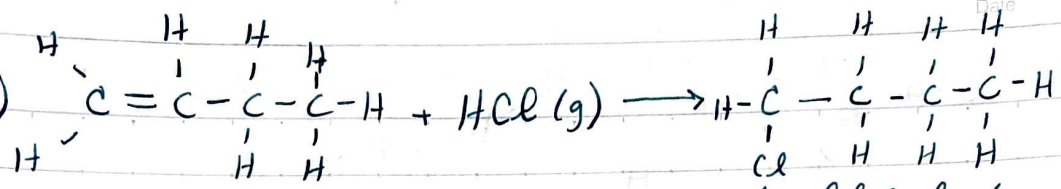
5. a) 

1-bromopropane

conditions: room temp

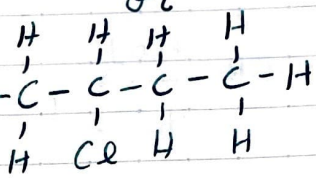


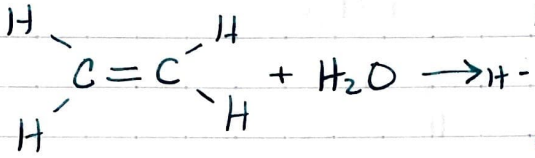
2-bromopropane

b)  1-chlorobutane

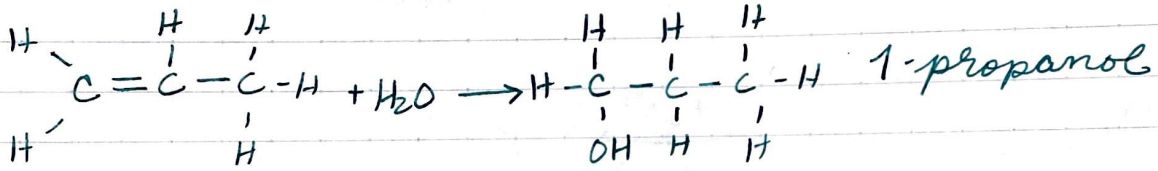
conditions: room temp

or

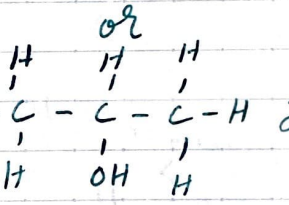
2-chlorobutane 

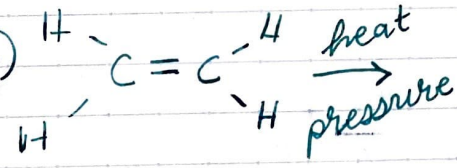
6. a)  ethanol

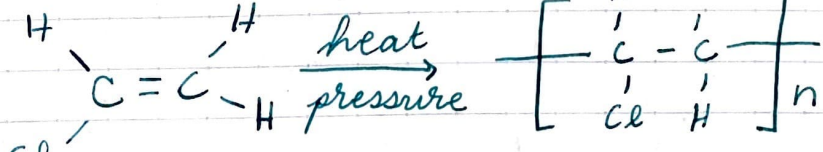
conditions: H_2SO_4, heat, pressure

b)  1-propanol

conditions: H_2SO_4, heat, pressure

or  2-propanol

7. a)  polyethene

b)  polychloroethene aka PVC

8 a) $C_2H_5OH(\ell) + 3O_2(g) \longrightarrow 2CO_2(g) + 3H_2O(g)$

conditions: excess O_2, ignition source

No.

Date

[O]: $K_2Cr_2O_7$ or $KMnO_4$

9. a) $CH_3CH_2OH \xrightarrow[\Delta]{+[O],\ H_2SO_4} CH_3CHO$ ethanal $+ H_2O$

b) $CH_3CH_2OH \xrightarrow[\Delta]{+[O],\ H_2SO_4} CH_3COOH$ ethanoic acid $+ H_2O$

reflux

c) $CH_3CH(OH)CH_3 \xrightarrow[\Delta]{+[O],\ H_2SO_4} CH_3COCH_3 + H_2O$ propanone

d) $CH_3CH(OH)CH_3 \xrightarrow[\Delta]{+[O],\ H_2SO_4}$ no rxn

e) $CH_3CHO \xrightarrow{NaBH_4 \text{ or } LiAlH_4,\ H_2SO_4} CH_3CH_2OH$

10. a) $CH_3CH_2OH + CH_3COOH \underset{\Delta}{\overset{H_2SO_4}{\rightleftharpoons}} CH_3COOCH_2CH_3 + H_2O$

ethyl ethanoate

b) $CH_3OH + CH_3CH_2COOH \underset{\Delta}{\overset{H_2SO_4}{\rightleftharpoons}} CH_3OCOCH_2CH_3 + H_2O$

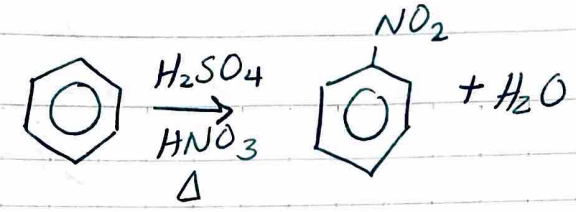
methyl propanoate

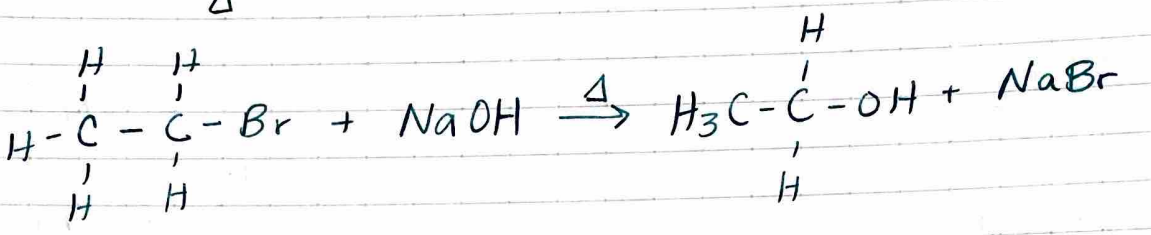
c) $CH_3COCl + HOCH_2CH_3 \longrightarrow CH_3COOCH_2CH_3 + HCl$

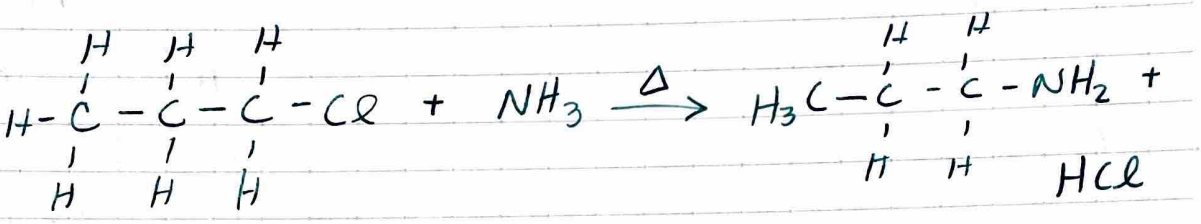
ethyl ethanoate

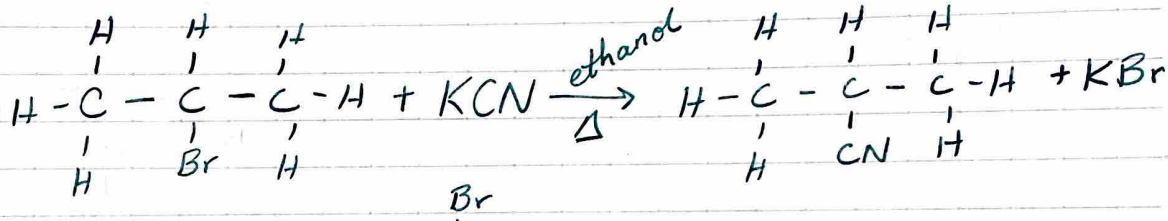
conditions: room temp

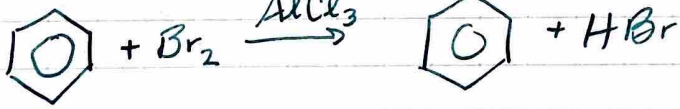
no catalyst needed → Cl is better leaving group than OH

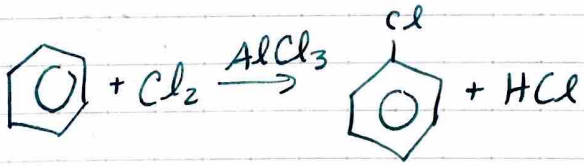
12. a) 

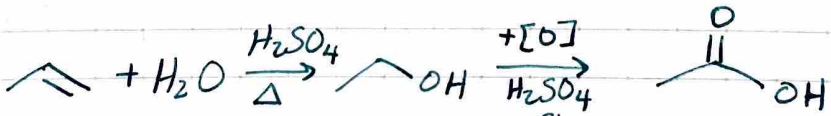
11. a) 

b) 

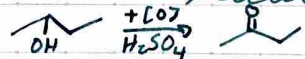
c) 

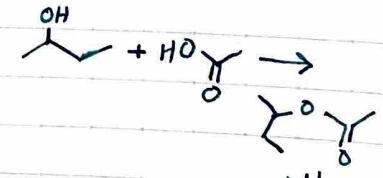
13. b) 

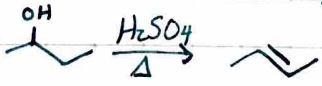
c) 

14. a) 

hydration then oxidation

b) 1. butanone 

2. butan-2-yl ethanoate $+ H_2O$ 

3. but-2-ene 

15. Alkene (does not indicate UV light was used)

a) decolorization indicates addition to alkene

b) tertiary alcohols since they do not readily undergo oxidation