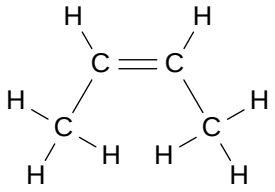
Answers to 3.5 Paper 1

Question One

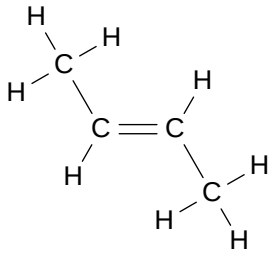
a $CH_3CH(OH)CH_3$ **or** $CH_3CH_2CH(OH)CH_3$ **or** $CH_3(CH_2)_2CH(OH)CH_3$
A = any one correct formula

b propan-1-ol **and** propan-2-ol **or** but-1-ene **and** but-2-ene
OR any 2 of: butan-1-ol, butan-2-ol, 2-methylpropan-1-ol, 2-methylpropan-2-ol
OR pentan-1-ol **and** pentan-2-ol
OR pent-1-ene **and** pent-2-ene
A = any correct pair

c **i** But-2-ene isomers



cis-but-2-ene



trans-but-2-ene

A = correct structures and labels

ii There are no geometric isomers of but-1-ene because it does not have 2 different groups on each of the double bonded C atoms.
M = correct explanation

Question Two

a **i** $CH_3CH{=}CH_2$ OR $CH_3C{\equiv}CH$

ii $CH_3CH(OH)CH_3$

iii $HCOOCH_2CH_3$ OR CH_3COOCH_3
A = 2 correct, M = all 3 correct

b **i** $CH_3CH_2CHBrCH_3$

ii $CH_3CH(OH)CH_2CH_3$

iii elimination
A = 1 correct formula plus correct type of reaction, M = all 3 parts correct

c **i**

Reaction	Compound	Observation
A	CH_3CH_2COOH $CH_3CH_2CH_2NH_2$ (other compounds neutral)	Turns red Turns blue
B	$CH_3(CH_2)_3CH{=}CH_2$	Orange to colourless **or** decolourises
C	CH_3CH_2CHO	Silver mirror formed **or** black silver specks
D	$CH_3CH_2CH_2OH$ (CH_3CH_2CHO)	Orange to green

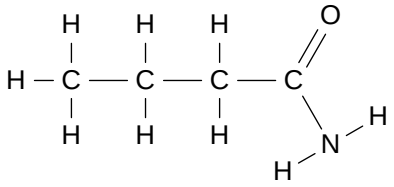
A = 2 rows correct, M = 4 correct rows, E = all correct with one of the bracketed results also

2

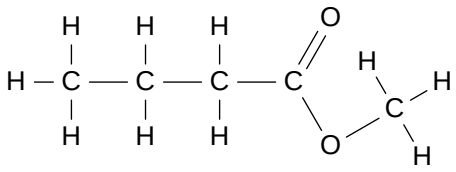
ii $CH_3COCH_2CH_3$ ketone (carbonyl group)
A = both correct answers

d **i** butanoyl chloride A

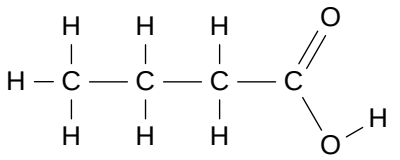
ii



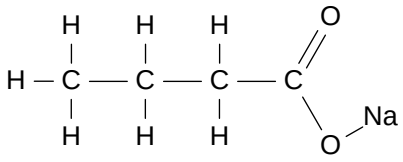
butanamide



methyl butanoate



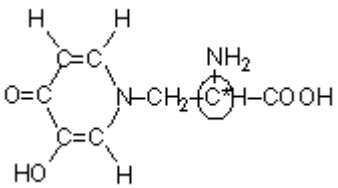
butanoic acid



sodium butanoate
A = 2 correct with names, M = 3 correct with names, E = all correct with names

Question Three

i



A = correctly labelled

ii carboxylic acid / alkene /amine / ketone / alcohol
A = any 3 correctly named

Question Four

a **i** reflux A

ii condenser A

iii It is necessary so that the reactants/products are not lost to the atmosphere before hydrolysis has a chance to be completed.
A = one point mentioned, M = both points

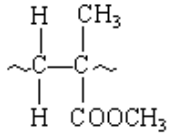
b $CH_3CH=CHCH_2CH_3$ A

c

Compound	With water	With litmus	With bromine
Ethanoyl chloride	Vigorous reaction with a gas given off	Turns litmus from blue to red	
Propanamine	Dissolves	Turns litmus from red to blue	
Cyclohexene	Immiscible, forms two layers		Turns from brown to colourless rapidly
Chlorobutane	Immiscible, forms two layers		No immediate reaction

A = 2 identified correctly, M = 3 correctly identified, E = all 4 correctly identified

Question Five

a **i**  **and** $\sim CO(CH_2)_4CONH(CH_2)_6NH\sim$

A = one correct, M = both correct

ii P1: $HO-(CH_2)_6-OH$
R1: $Cr_2O_7^{2-}/H^+$ **or** MnO_4^-/H^+
P2: $HOOC-(CH_2)_4-COOH$
R2: $PCl_3/PCl_5/SOCl_2$
A = one correct product and reagent, M = 3 of the 4 correct, E = all correct

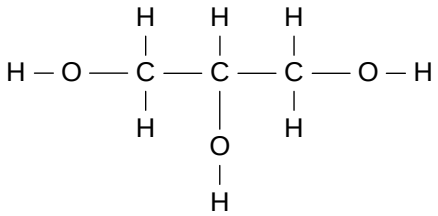
b **i** glucose A

ii NH_2 A

iii In acid conditions $-NH_3^+$ is formed and moves to the negative electrode.
In acid conditions $-COO^-$ is formed and moves to the positive electrode.
A = minor error, M = all correct

Question Six

a



propan-1,2,3-triol A = both correct

b **i** lauric / myristic / palmitic / stearic / dodecanoic / tetradecanoic / hexadecanoic /octadecanoic acid A = any ONE correct

ii palmitoleic / oleic / *cis*-octadec-9-enoic acid / *cis*-hexadec-9-enoic acid A = any ONE correct

iii The bond must break and then it must reform.
A = break, M = break and reform

Judgement Statement

Achievement: **13 questions correctly answered.**
A minimum of 13 × A

Merit: **16 questions correctly answered with 6 at Merit level**
A minimum of 10 × A + 6 × M

Excellence: **18 questions correctly answered correctly with 8 at Merit level and 2 at Excellence level.**
A minimum of 8 × A + 8 × M + 2 × E