Practice Question Set For A-Level
Subject : Chemistry
Paper-2 Topic: Alkenes

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Exam Preparation and Free Resources

Name of the Student:_____
Max. Marks : 25 Marks **Time : 25 Minutes**

Mark Schemes

Q1.

(a)

	C	H
%mass	88.2	11.8
mol	$\frac{88.2}{12}$	$\frac{11.8}{1}$
	= 7.35	= 11.8
÷ smaller	$\frac{7.35}{7.35}$	$\frac{11.8}{7.35}$
	= 1	= 1.61
x5	= 5	= 8

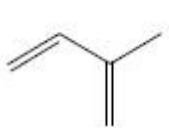
Empirical formula = molecular formula C_5H_8

M1 *for amounts 7.35 and 11.8* **1**

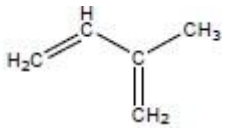
M2 *for process dividing* ***M1*** *by smaller* **1**

M3 *for answer C_5H_8 only* **1**

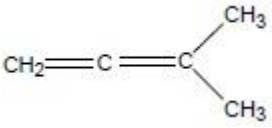
M4 (must be branched)



OR



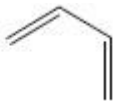
Allow alternatives



$HC{\equiv}CCH(CH_3)_2$ **1**

(b)

OR



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Must be skeletal

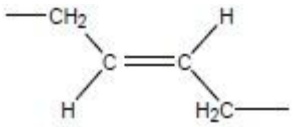
1

Buta-1,3-diene

M2** can only be this and is independent of **M1

1

(c)



Must show trailing bonds

Ignore brackets and n

Allow skeletal – with brackets

Must be E 'trans'

1

Mark independently

Restricted rotation about the C=C or double bond

Allow lack of rotation/no rotation/limited rotation about the C=C or double bond

Ignore different groups on each carbon of the C=C double bond

1

(d) Carbon Carbon bonds are non polar or (too) strong or not attacked by nucleophiles

Or

Carbon Carbon bonds cannot be hydrolysed

Allow carbon chains.....

OR

Bonds between repeating units.....

Ignore C−H bonds

1

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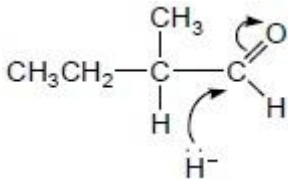
Q2.

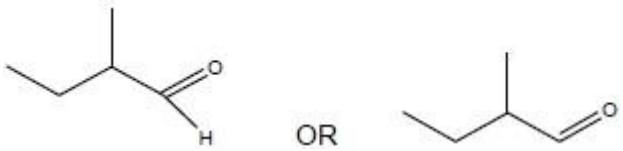
(a) **M1** for structure of 2-methylbutanal

Allow C_2H_5 for CH_3CH_2

1

M2 for **2** curly arrows and lp on hydride, i.e.





1

Explanation:

*Penalise **M2** for wrong partial charges on C=O*

Ignore product

M3 H^- ion / nucleophile is attracted to δ+ C

1

M4 electron rich C=C

1

M5 H^- ion / nucleophile is repelled by C=C

OR

C=C only attacked by/reacts with electrophiles

1

(b) Tollens' (reagent) OR ammoniacal silver nitrate OR description of making Tollens'

1

Silver mirror/ppt OR black solid / precipitate / deposit

1

NOT dichromate

For Tollens' reagent:

*for **M1** ignore either $AgNO_3$ or $[Ag(NH_3)_2^+]$ or "the silver mirror test" on their own, or "Tolling's reagent", but mark on*

OR Fehling's/ Benedict's (solutions)

red solid / precipitate (allow orange or brown)

For Fehling's/Benedict's solution:

*for **M1** Ignore $Cu^{2+}(aq)$ or $CuSO_4$ or "Fellings" on their own, but mark on*

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Q3.

(a) nucleophilic addition

both words needed

NOT any additional names

1

(b) **M1** racemic (mixture) / racemate

1

M2 planar (around) carbonyl / C=O

***M2** NOT molecule is planar*

Allow flat for planar

1

M3 (equal chance of) attack from each side (by CN^-)

1

M4 a correct structure of 2-hydroxypropanenitrile

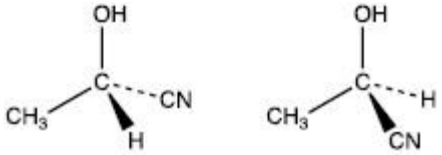
***M4** any correct 2D or 3D structure*

1

M5 correct 3D representations of both isomers, e.g.

***M5** must show at least one wedge bond and one dash bond in each structure and any bonds in the plane cannot be at 180º to each other*

*second structure could be drawn as mirror image of first **or** with same orientation with two groups swapped round, e.g.*



Allow ECF for second structure from incorrect first structure, providing molecule is chiral

1

(c) **M1** conc H_2SO_4 or conc H_3PO_4

***M1** Allow conc to come from conditions line*

1

M2 heat / 170°C

M2** depends on attempt at correct reagent in **M1

Allow high temperature / hot / 100-300°C / 373 – 573 K / reflux

Ignore references to pressure

Ignore warm

NOT ethanolic / alcoholic

1

Alternative answer

***M1** Al_2O_3*

***M2** pass vapour over hot Al_2O_3*

(d)

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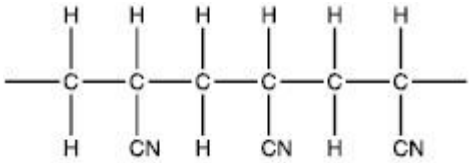

MUST show trailing bonds
Ignore any brackets or n
NOT C–N or C=N if CN group displayed
Allow structures with CN on either C in each of the three units
Allow –CH_2–CH(CN)–CH_2–CH(CN)–CH_2–CH(CN)–

1

[9]

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