AQA A-Level Chemistry

Aldehydes and ketones mark scheme · goes with “Aldehydes and ketones” · whiteboardchemistry.com/revision/aqa-a-level-chemistry/exam-questions

Mark schemes

Aldehydes and ketones · 10 questions

Q1 · June 2024 · Paper 2 · Q8 · [12 marks]

(a) M1 Electrophilic Addition

M2 HBr

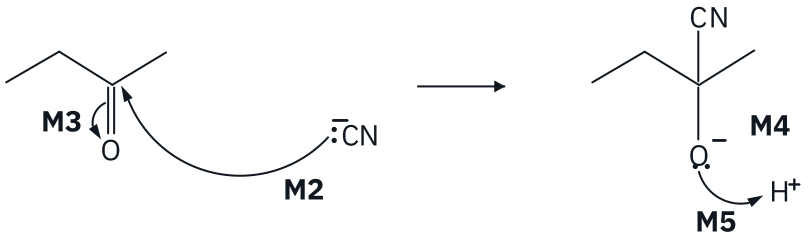
[2 marks]

(b) M1 Butan-2-ol or correct structure eg $CH_3CH(OH)CH_2CH_3$

M2 NaOH AND (warm) aqueous (Allow cold if stated)

[2 marks]

(c) M1 HCN or KCN/H_2SO_4



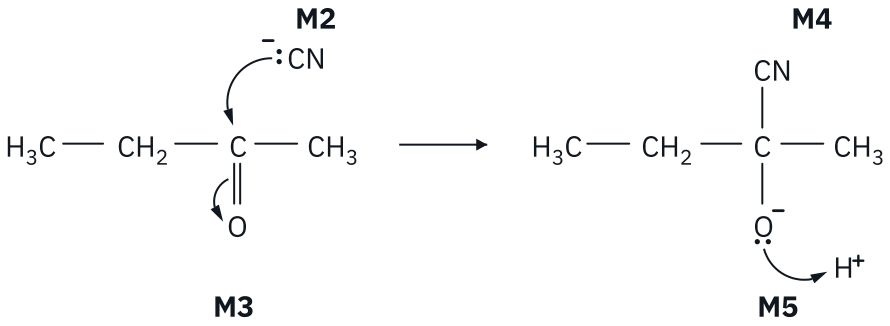
M2 Arrow from lone pair on C to C of C=O

M3 Arrow from C=O to O

M4 Structure of intermediate including negative on O

M5 Arrow from lone pair on O to H^+

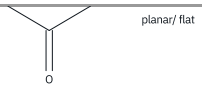
OR



[5 marks]

(d)

M1



Allow planar carbonyl group

M2 Equal chance (50/50) attack from above/below OWTTE

Either side

M3 Giving equal amounts of both optical isomers/enantiomers

[3 marks]

Q2 · June 2024 · Paper 2 · Q5 · [5 marks]

(a) M1 Misty / white / steamy fumes

M1 (immediate) White precipitate forms

M2 No visible change

M2 White precipitate forms slowly

[2 marks]

(b) M1 Propanal AND (blue solution gives a brick) red precipitate

If M1 incorrect, allow ECF for suitable tests on remaining liquids

M2	(Warm with) acidified potassium dichromate (VI)	add Na	warm with a named carboxylic acid with conc H_2SO_4	(Warm with) acidified potassium manganate (VII)
M3	Propan-1-ol/alcohol AND (orange solution) goes green	Propan-1-ol/alcohol AND effervescence	Propan-1-ol/alcohol AND fruity smell	Propan-1-ol/alcohol AND (purple solution) goes colourless

[3 marks]

Q3 · June 2024 · Paper 3 · Q24 · [1 mark]

Answer: **D**

$CH_3CH_2CHO \rightarrow CH_3CH_2CH(OH)CN$

Q4 · June 2024 · Paper 3 · Q27 · [1 mark]

Answer: **A**

2-hydroxy-2,3-dimethylbutanenitrile

Q5 · November 2021 · Paper 3 · Q3 · [11 marks]

(a) filter / decant

[1 mark]

dissolve in minimum vol

allow *small volume*

allow *to make saturated solution*

[1 mark]

of hot solvent

not *warm*

Ignore *hot filtration*

[1 mark]

cool / leave (to crystallise) AND filter (under reduced pressure)

[1 mark]

Wash with cold solvent/water, and dry (with method)

[1 mark]

(b) M1 toxic / poisonous

allow *can produce toxic fumes/gas / corrosive*

[1 mark]

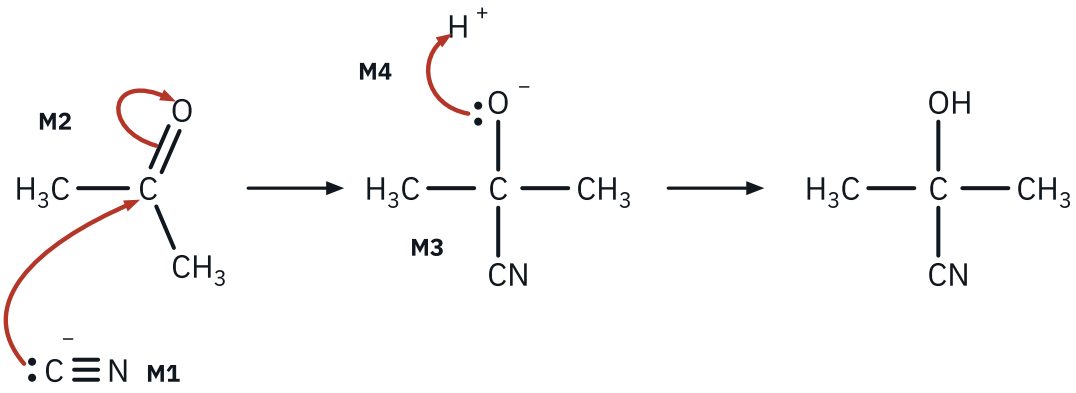
M2 HCN weak / [CN^-] too low ORA

allow *KCN dissociates to provide CN^-/nucleophile*

allow *KCN dissociates better/more than HCN*

[1 mark]

(c)



M1 cyanide ion with lone pair on C and negative charge and curly arrow from lone pair to C of C=O

not *if K–CN bond shown breaking*

[1 mark]

M2 Curly arrow from = to O

not *if dipole incorrect*

[1 mark]

M3 intermediate anion

new bond must be to C of CN

[1 mark]

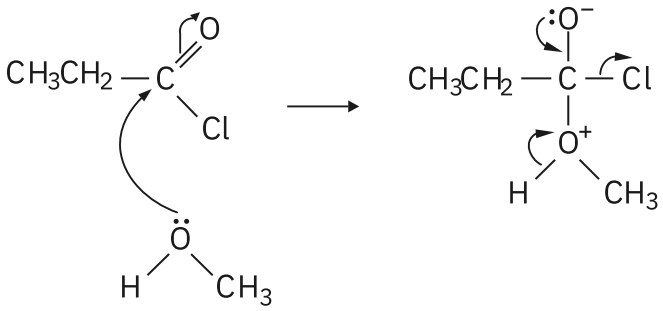
M4 curly arrow from lone pair on O to H^+

allow *curly arrow to H of HCN*

[1 mark]

Q6 · June 2023 · Paper 2 · Q3 · [12 marks]

(a)



M1 Structures of reactant species

M2 Arrow from lp on O to C

M3 Arrow from C=O bond to O

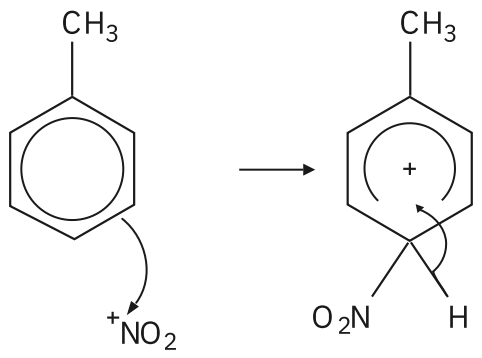
M4 3 curly arrows and lp on intermediate

Allow full marks for candidates who draw a second intermediate formed after formation of C=O and loss of Cl^- *then loss of* H^+

Ignore any attempt to show the final products

[4 marks]

(b)



M1 Structures of reactant species including + on N of $+NO_2$

M2 Arrow from ring (inside hexagon) to N or + on N

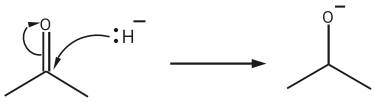
M3 Arrow from C-H bond into hexagon

M4 Electrophilic substitution

Apply list principle

[4 marks]

(c)



M1 Arrow from lp on hydride to C

M2 Arrow from C=O to O

M3 Intermediate structure / Allow displayed or abbreviated structures

Ignore any attempt to show further steps if correct Penalise further incorrect steps

M4 Nucleophilic addition

Apply list principle

[4 marks]

Q7 · June 2017 · Paper 3 · Q21 · [1 mark]

Answer: **B**

Q8 · June 2017 · Paper 3 · Q23 · [1 mark]

Answer: **B**

Q9 · June 2018 · Paper 3 · Q10 · [1 mark]

Answer: **D**

Q10 · June 2018 · Paper 3 · Q28 · [1 mark]

Answer: **B**

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