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

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Exam Preparation and Free Resources

Name of the Student:_____
Max. Marks : 29 Marks **Time : 29 Minutes**

Mark Schemes

Q1.

(a) **M1** idea that pentan-2-ol has stronger intermolecular forces

M1 *idea that hydrogen bonds are stronger than van der Waals' forces*

Penalise ***M1*** *for any reference to idea of breaking covalent bonds*

1

M2 pent-1-ene has van der Waals' forces (only)

M2 *allow London forces or temporary/induced dipole forces or vdW forces for van der Waals' forces*

1

M3 pentan-2-ol (also) has hydrogen bonds

M3 *Ignore reference to dipole-dipole forces in pentan-2-ol*

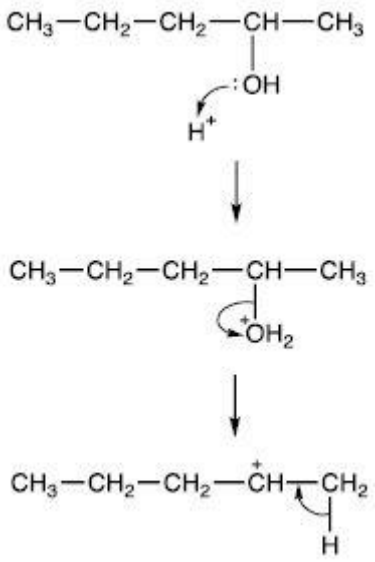
1

(b) **M1** reagent = conc sulfuric acid or conc phosphoric acid

M1 *penalise incorrect name or formula (even if both name and formula are given)*

1

M2 condition = hot / temperature in range 150-200°(C)



M2 *allow high temperature*

M2 *reagent must indicate an acid in some way in order for* ***M2*** *to be awarded*

M1/2 *allow 1 mark if H_2SO_4/H_3PO_4 given as reagent and conc(entrated) given as condition*

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1

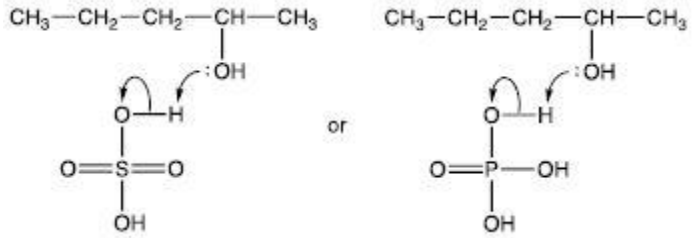
M3 curly arrow from lone pair on alcohol O to H^+

M3-5

*penalise **M3/4/5** for any additional arrow(s) in addition to the correct one at each stage*

*If incorrect reactant (or product if shown), maximum 2 marks of **M3-5***

Alternatives for M3



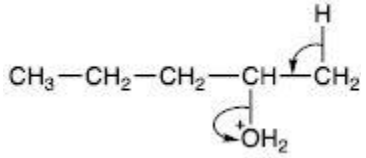
1

M4 curly arrow from C-O bond to O on correct intermediate

1

M5 arrow from C-H bond on C1 to C-C bond between C1 and C2 on correct carbocation

*allow **M4** and **M5** concurrent:*



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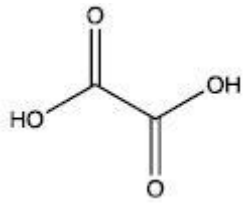
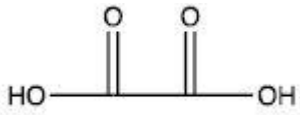
Q2.

(a)



Any correct skeletal representation, but alcohol H's should be shown and C atoms should not be shown



1

(b) **M1** acidified potassium dichromate(VI) or sulfuric acid & potassium dichromate(VI)

M1 *H_2SO_4 and $K_2Cr_2O_7$ or H^+ and $K_2Cr_2O_7$*

do not need (VI), but if oxidation state given it must be correct

allow other strong acids

1

M2 reflux

M2 *need an attempt at an oxidising agent in* ***M1***

1

(c) **M1** amount of $H_2C_2O_4$ = $0.400 \times \frac{10}{1000}$ = 0.004 mol

1

NaOH in excess

M2 amount of NaOH = $0.200 \times \frac{50}{1000}$ = 0.010 mol

NaOH in excess: *allow ECF from* ***M1/2*** *to* ***M3*** *as long as the amounts do have NaOH in excess*

1

M3 amount of NaOH needed for reaction = 0.008 mol or amount of left over NaOH needed for reaction = 0.002 mol or 0.005 mol of $H_2C_2O_4$ needed for all NaOH to react

M3 *Allow any reasoned justification using moles to show that NaOH is in excess (it must take into account the 2:1 ratio in some way)*

1

Yield

M4 amount of $Na_2C_2O_4$ formed = 0.004 mol

1

M5 mass of $Na_2C_2O_4$ = 134.0 x 0.004 = 0.536 g = 536 mg

Yield: *allow ECF from* ***M1*** *to* ***M4****, and from* ***M4*** *to* ***M5***

536 mg scores ***M1,4,5***

0.536 g scores ***M1,4***

1

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Q3.

(a) **M1** Q, R, S, T

M1 Allow the mark for candidates who correctly name or draw the isomers.

1

M2 (Orange solution) turns green

Independent

1

(b) **M1** T

As above

1

M2 Silver mirror

Allow grey/black ppt

1

(c) **M1** P, Q, R, S

As above

1

M2 Sweet smelling (liquid)

1

M3 To react with (remove excess) acid / neutralise

Allow easier to identify the smell

1

(d) Position

Allow positional

1

(e) **M1** R & S have an O-H alcohols peak at 3230-3550 cm^{-1}

Allow value within the range

1

M2 T has C=O peak at 1680-1750 cm^{-1}

1

M3 R & S (unique) fingerprint region or below 1500 cm^{-1}

1

M4 Compare to a database / known spectra (and look for an exact match)

1

(f) All have the same M_r

Allow

same (molecular) ion M/Z peak

same molecular formula

1

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