Practice Question Set For A-Level
Subject : Chemistry
Paper-2 Topic: Carboxylic Acids & Derivatives

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Exam Preparation and Free Resources

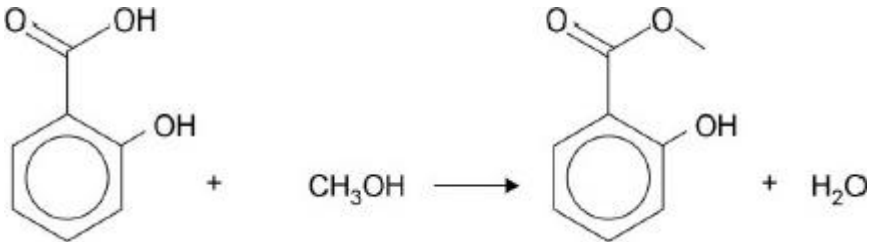
Name of the Student:_____
Max. Marks : 19 Marks **Time : 19 Minutes**

Mark Schemes

Q1.

(a) **M1** Skeletal formula of organic product

M2 Rest of equation



M1 Need H on alcohol OH

M1 Allow O-H for alcohol OH

M2 for correct formulae for 2-hydroxybenzenecarboxylic acid and methanol on left and H_2O on right

M2 Allow $C_7H_6O_3$/HOC_6H_4COOH and CH_4O

Ignore additional non-skeletal structures for ester (assume it is working out)

Allow Kekulé structures for rings

2

(b) Ethanoic anhydride/It is less/not corrosive
OR
Ethanoic anhydride/It does not form strong acid/HCl /(only) forms weak/ethanoic/carboxylic acid
OR
Ethanoic anhydride/It is less/not vulnerable to hydrolysis

Allow reverse argument for ethanoyl chloride e.g. ethanoyl chloride is (more) corrosive

Ignore cost/less volatile/products are less harmful/safer/toxic/produces toxic fumes

Ignore references to less/more exothermic/violent/vigorous

1

(c) (Nucleophilic) addition-elimination

Ignore esterification/acylation

1

(d) Catalyst

Ignore proton donor/heterogeneous/homogeneous

Allow speeds up reaction/lowers activation energy

1

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(e) Boiling points are above 85 °C

Allow product(s) or reactant(s) or named product(s) or reactant(s) boiling points are above 85 °C

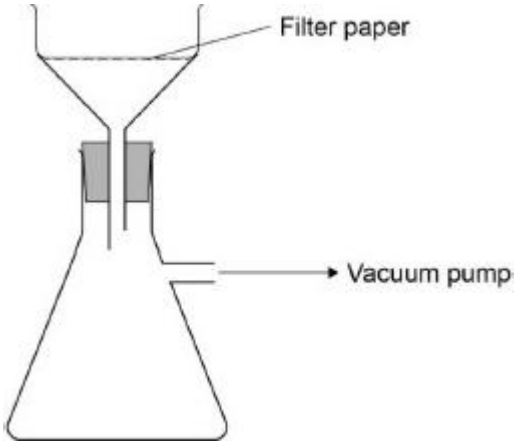
Allow none of them would boil/mixture would not boil/do not need to boil the mixture

Allow no volatile reagent(s)/product(s)/reactant(s)

Ignore reference to mixture/substances not evaporating/vaporising

1

(f)



M1

- Cross sectional (i.e. funnel top and bottom shown open)
- Bung or collar drawn (with funnel spout visible through)
- (Buchner/Hirsch) Funnel - approximate shape
- Horizontal filter paper - allow solid or dashed line

M2

Labels must include filter paper and indication of vacuum/water pump/reduced pressure/suction

2

(g) Any 2 of:

- Ethanoic acid
- Phosphoric acid
- 2-hydroxybenzenecarboxylic acid
- Ethanoic anhydride
- Water

Ignore catalyst/unreacted reactants

Allow names or correct formulae

Allow salicylic acid/2-hydroxybenzoic acid

2

(h) **M1** Dissolve crude product in <u>hot</u> solvent (water and ethanol)

Ignore initial filtration

M1 not wrong solvent if named

M2 of minimum volume

M2 Allow reference to saturated solution as alternative to minimum volume

M3 Filter (hot to remove insoluble impurities)

M3 Ignore method of filtration

Allow decant

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M4 Cool (to recrystallise)

M5 Filter under reduced pressure / with Buchner/Hirsch apparatus

M6 Wash (with cold solvent) **and** dry

M6 Allow water and/or ethanol

Apply list principle for each additional process (e.g. drying agent added, base to neutralise acid added, distillation, solvent extraction) in an incorrect method

Ignore reference to melting point determination

6

(i) **M1** Melting point

M1 Ignore boiling point

M2 Lower (than data book value)

M2/3 In either order

M2 Ignore 'different'

M2 ECF for 'higher' if b.pt in M1

M2If b.pt in M1 NOT 'lower'

M3 Melts over a (wide) range of temperature (rather than sharp/narrow range if pure)

M3 ECF from b.pt

3

[19]

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