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 : 21 Marks **Time : 21 Minutes**

Mark Schemes

Q1.

(a) Electrophilic substitution both words needed

Allow minor spelling errors e.g. electrophillic or subsitution

Ignore nitration

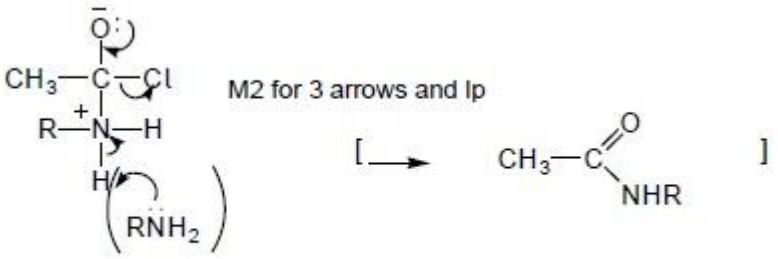
1

(b) + $3H_2$ ..... + $2H_2O$

Allow 6 [H]

1

(c)



M1 *for structure of ion including 2 charges (+ on N must be correct in both cases if drawn twice)*

M2 *for 3 arrows and lp on O - may be scored in two steps*

Ignore use of RNH_2 to remove H^+ in ***M2****, but penalise use of Cl^-*

2

(d) Corrosive **OR** forms strong acid/HCl (fumes) **OR** vulnerable to hydrolysis **OR** dangerous (to use)

Allow anhydride is less corrosive ***OR*** *does not form strong acid fumes* ***OR*** *less vulnerable to hydrolysis*

OR *ethanoyl chloride is more expensive*

Allow reacts violently / extremely exothermic / extremely vigorous

Ignore toxic / harmful / hazardous

1

(e)

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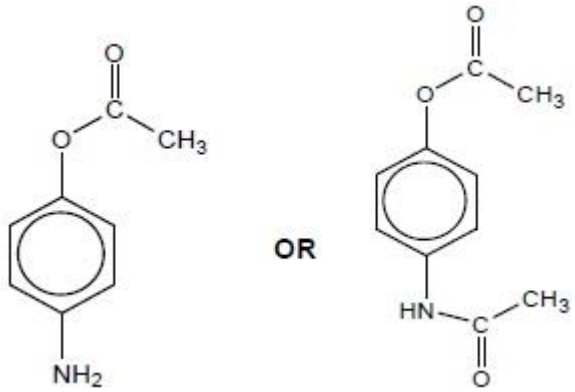

1

(f) + CH_3COONH_4 ..... + $2H_2O$

Allow CH_3COO^- / $CH_3CO_2^-$ and NH_4^+

Allow NH_4CH_3COO

1

(g) *Via moles*

M1M_r paracetamol = 151(.0)

M1

M2 Amount paracetamol = 250×10^3 / 151.0 = 1655.6 mol
OR (250×10^3) / **M1**

(= amount hydroquinone used)

M2

M3 Mass hydroquinone = 1655.6 × 110.0 = 182119 g = 182 kg
OR correct answer to **M2** × 110.0 / 1000

M3

OR via mass
M1 *M_r paracetamol = 151(.0)*
So 110 g hydroquinone forms 151 g paracetamol
M2 *Mass hydroquinone needed 250 × 110 / 151.0*
OR *250 × 110 /* ***M1***
= 182 kg

Min 2sf
If Mr values used wrong way round can score ***M2***

[10]

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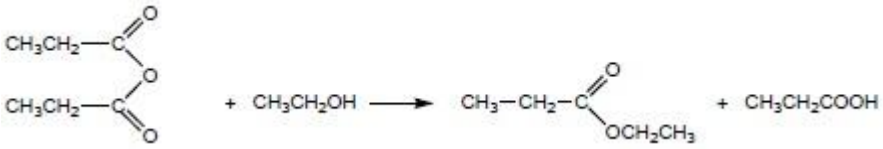
Q2.

(a)



Ethyl propanoate only

M1 *Structure of ester (allow $C_2H_5CO_2C_2H_5$)*

1

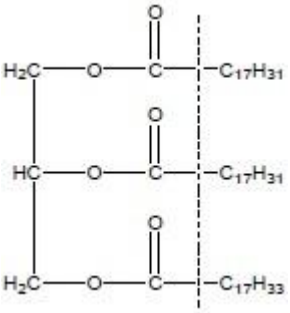
M2 *propanoic acid formula (allow $C_2H_5CO_2H$) and correctly balanced equation*

1

M3 *Ethyl propanoate only*

1

(b)



M1 for all except $C_{17}H_{3x}$ (i.e. all to the left of the dotted line)

Allow $–O_2C–$, –OOC–, –OCO–

Not $–CO_2–$, –COO–

1

M2 for two $C_{17}H_{31}$ and one $C_{17}H_{33}$ in any order top to bottom

1

(c)

M1 for skeleton

1

M2 for both Z correct
Independent marks

1

C9 – C14 shown with double bonds in the correct place

Ignore structure beyond carbon 14

*If hydrogens shown or not skeletal can only score **M2***

Other representations include

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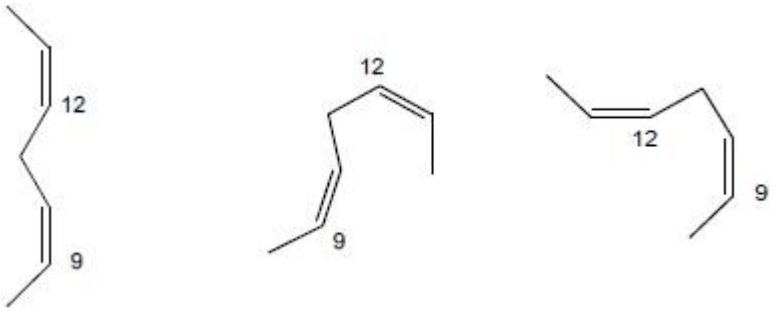

(d) $C_{19}H_{34}O_2 + 26½\ O_2 \longrightarrow 19\ CO_2 + 17\ H_2O$

Allow 53/2 or all doubled

1

(e) Absorption in spectrum at 2350 cm^{-1} does not correspond to data booklet value of 1680 – 1750 cm^{-1} or for C=O bonds in organic compounds)

Allow would expect a peak at 1680 – 1750 cm^{-1}

1

(f) C=O Bonds in CO_2 absorb infrared radiation (of 2350 cm^{-1})

1

IR radiation emitted by the earth does not escape (from the atmosphere)
OR
This energy is transferred to other molecules in the atmosphere by collisions (so all atmosphere is warmed)

Ignore IR reflected

1

[11]

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