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 : 22 Marks **Time : 22 Minutes**

Mark Schemes

Q1.

(a) (i) 2-hydroxypropanoic acid
OR
2-hydroxypropan(-1-)oic acid

Do not penalise different or missing punctuation or extra spaces.
Spelling must be exact and order of letters and numbers as here.
Can ignore −1− before –oic, but penalise any other numbers here.

1

(ii) $C_{12}H_{22}O_{11} + H_2O \longrightarrow 4CH_3CH(OH)COOH$
Allow $4C_3H_6O_3$

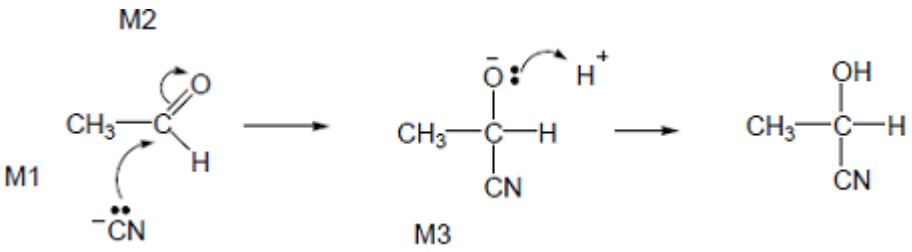
OR

$C_{12}H_{22}O_{11} + H_2O \longrightarrow 2CH_3CH(OH)COOH + C_6H_{12}O_6$
Allow $2C_3H_6O_3$

1

(b) (i) Nucleophilic addition

M4 for lp, arrow and H+



- M1 lp and minus must be on C
- M1 and M4 include lone pair and curly arrow.
- M2 not allowed independent of M1, but allow following some attempt at attack on carbonyl C
- allow M1 for correct attack on C+
- + rather than δ+ on C=O loses M2
- M3 is for correct structure including minus sign but lone pair is part of M4
- Allow arrow in M4 to H of H-CN with arrow forming cyanide ion.

5

(ii) Equal mixture of enantiomers / (optical) isomers

1

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(iii) (Plane) polarized light

If missing no further mark.

1

(Polarised light) <u>rotated</u> by single enantiomer but unaffected by racemate

Both needed; not allow bend, twist etc.

1

(c) (i) $CH_3CH(OH)COOH + NaOH \rightarrow CH_3CH(OH)COONa + H_2O$
OR $CH_3CH(OH)COOH + OH^- \rightarrow CH_3CH(OH)COO^- + H_2O$

Not ambiguous mol formulae for product - must show COONa or CO_2Na or COO^- or CO_2^-

1

(ii) $[H^+] = K_a$ **OR** $pH = pK_a$

1

pH = 3.86

Allow more than 2 decimal places but not fewer.

1

(iii) M1 buffer

Ignore acidic but penalise alkaline or basic.

1

Any two out of the three marks M2 , M3 & M4

M2 Large lactate concentration in buffer
OR sodium lactate completely ionised

M3 added acid reacts with / is removed by lactate ion or A^- or sodium lactate or salt
OR equation $H^+ + A^- \rightarrow HA$

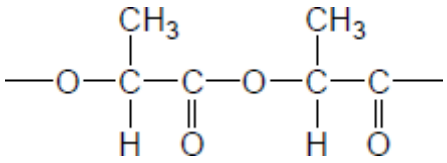
Ignore reaction of H^+ with OH^-
Ignore reference to equilibrium unless it is shown.

M4 ratio $[HA] / [A^-]$ stays almost constant

Ignore H^+ or pH remains constant.

Max 2

(d) (i)



No marks if ester link missing

Correct ester link
allow –COO–

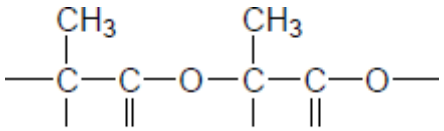
NB Correct answer scores 2

Ignore n here (compare with (d)(iv).
Ignore brackets

1

OR

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All rest correct with trailing bonds

If OH or COOH on either or both ends, lose one, ie dimer scores 1

If more than two repeating units, lose 1

1

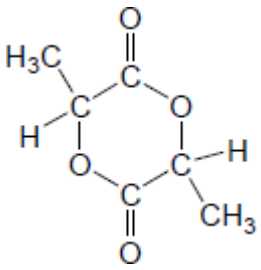
(ii) (Poly)ester ie allow ester

Not terylene.

Ignore spaces and brackets in answer.

1

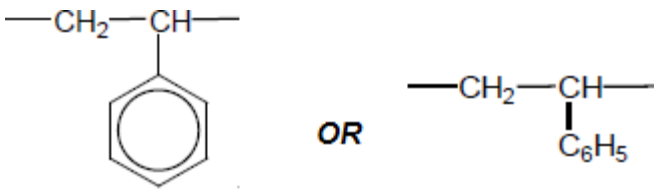
(iii)



Allow any <u>cyclic $C_6H_8O_4$</u>

1

(iv)



Penalise n here (compare with (d)(i)

Ignore brackets.

Not allow Ph for phenyl.

1

(v) In landfill, no air or UV, to assist decay
OR not enough water or moisture (to hydrolyse polyester)

Allow landfill has / contains:

no or few bacteria / micro-organisms / enzymes compared with compost heap

OR less oxygen

OR <u>lower</u> temperature.

1

[22]

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