

Name of the Student: _____

Max. Marks : 19 Marks

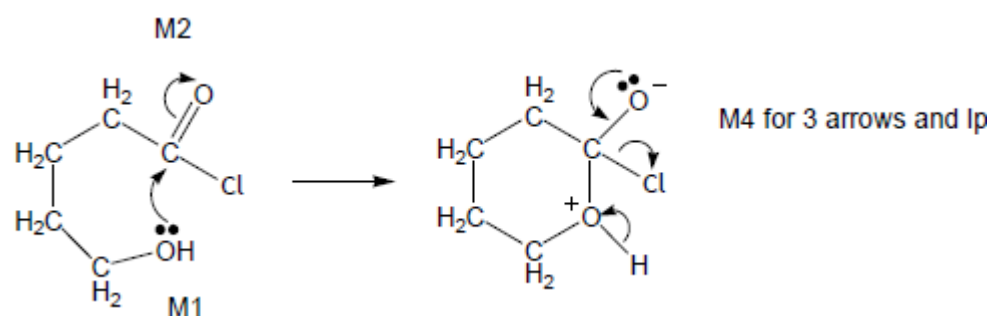
Time : 19 Minutes

Mark Schemes

Q1.

- (a) (i) (nucleophilic) addition-elimination
Not electrophilic addition-elimination
Ignore esterification

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M3 for structure

- If wrong nucleophile used or O–H broken in first step, can only score M2.
- M2 not allowed independent of M1, but allow M1 for correct attack on C+
- + rather than $\delta+$ on C=O loses M2.
- If Cl lost with C=O breaking lose M2.
- M3 for correct structure with charges but lone pair on O is part of M4.
- Only allow M4 after correct / very close M3.
- Ignore HCl shown as a product.

4

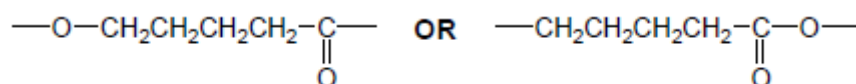
- a 20-50 (ppm) or single value or range entirely within this range
 If values not specified as a or b then assume first is a.

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- b 50-90 (ppm) or single value or range entirely within this range

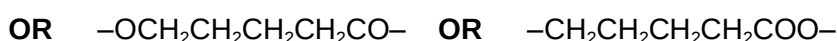
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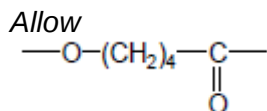
(ii)



Must have trailing bonds, but ignore n.

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but not $\text{---C}_4\text{H}_8\text{---}$

one unit only

Condensation

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(b)

	Tollens'	Fehling's / Benedicts	Acidified potassium dichromate
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Penalise wrong formula for Tollens or missing acid with potassium dichromate but mark on.

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J	No reaction / no (visible) change / no silver mirror	No reaction / no (visible) change / stays blue / no red ppt	No reaction / no (visible) change / stays orange / does not turn green
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Ignore 'clear', 'nothing'.

Penalise wrong starting colour for dichromate.

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K	Silver <u>mirror</u> / grey <u>ppt</u>	Red <u>ppt</u> (allow brick red or red-orange)	(orange) turns green
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J Two (peaks)

Allow trough, peak, spike.

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K Four (peaks)

Ignore details of splitting.

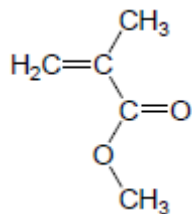
If values not specified as J or K then assume first is J.

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- (c) If all the structures are unlabelled, assume that the first drawn ester is L, the second ester is M; the first drawn acid is N, the second P. The cyclic compound should be obvious.

L

ester



OR $\text{H}_2\text{C}=\text{C}(\text{CH}_3)\text{COOCH}_3$

All $\text{C}_5\text{H}_8\text{O}_2$ L to P must have $\text{C}=\text{C}$.

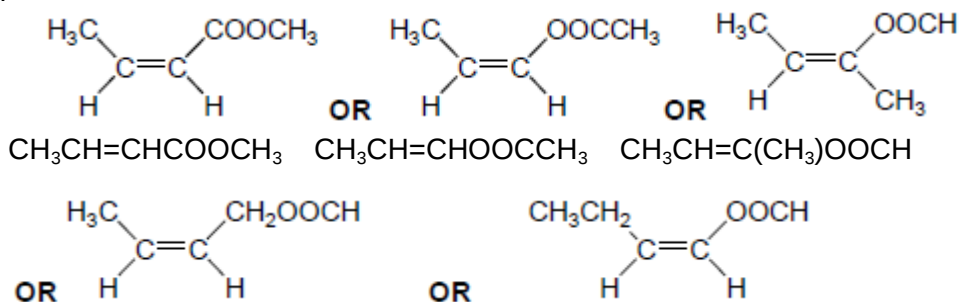
Allow CH_3- .

Allow $-\text{CO}_2\text{CH}_3$ etc.

Allow $\text{CH}_2\text{C}(\text{CH}_3)\text{COOCH}_3$.

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M
ester



$\text{CH}_3\text{CH}=\text{CHCH}_2\text{OOCH}$

$\text{CH}_3\text{CH}_2\text{CH}=\text{CHOOCH}$

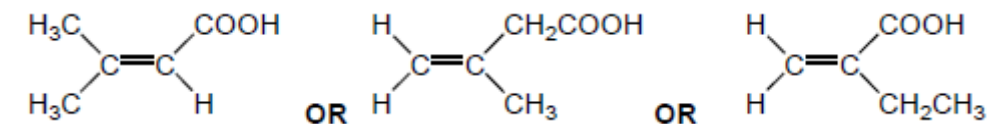
Allow either *E-Z* isomer.

Allow CH_3- or C_2H_5- but not CH_2CH_3- .

Allow $\text{CH}_3\text{CHCHCOOCH}_3$ etc.

1

N
acid



$(\text{CH}_3)_2\text{C}=\text{CHCOOH}$

$\text{H}_2\text{C}=\text{C}(\text{CH}_3)\text{CH}_2\text{COOH}$

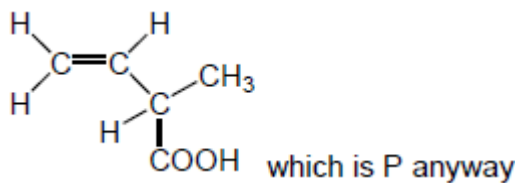
$\text{H}_2\text{C}=\text{C}(\text{COOH})\text{CH}_2\text{CH}_3$

Allow CH_3- or C_2H_5- but not CH_2CH_3- .

Allow $-\text{CO}_2\text{H}$.

Not cyclic isomers.

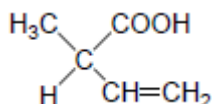
Not the optically active isomer.



Allow $(\text{CH}_3)_2\text{CCHCOOH}$ etc.

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P
acid



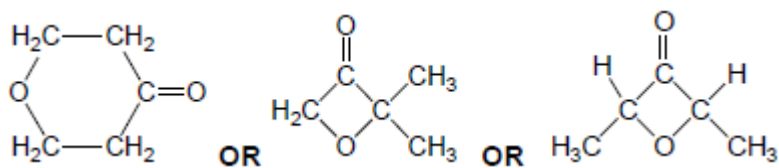
Allow $-\text{CO}_2\text{H}$.



Allow $\text{CH}_3\text{CH}(\text{CO}_2\text{H})\text{CHCH}_2$ or
 $\text{CH}_3\text{CH}(\text{CO}_2\text{H})\text{C}_2\text{H}_5$.

1

Q



Not cyclic esters.

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[19]