Name of the Student:_____
Max. Marks : 26 Marks **Time : 26 Minutes**

Mark Schemes

Q1.

(a) (i) $CDCl_3$ or CD_2Cl_2 or C_6D_6 or CCl_4
Not D_2O Allow CD_3Cl
1

(ii) 4 **or four**
1

(iii) Triplet or 3 or three
1

(iv) 1,4-dichloro-2,2-dimethylbutane
Do not penalise different or missing punctuation or extra spaces.
Spelling must be exact and order of letters and numbers as here.
1

(b) (i) 3 or three
1

(ii) 190-220 (cm^{-1})
Allow a single number within the range.
***OR** a smaller range entirely within this range.*
1

(iii) hexan**e**-2,5-dione
Do not penalise different or missing punctuation or extra spaces.
Spelling must be exact and order of letters and numbers as here.
NB so must have middle e
1

[7]

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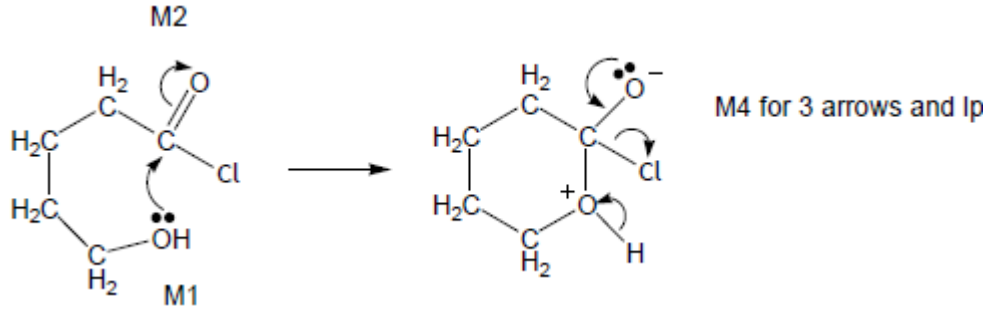
Q2.

(a) (i) (nucleophilic) addition-elimination

Not electrophilic addition-elimination

Ignore esterification

1



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 δ+ 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

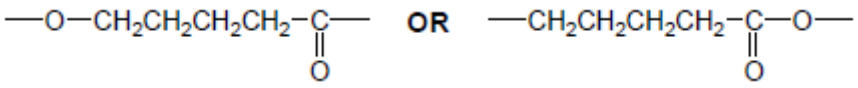
If values not specified as a or b then assume first is a.

1

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

1

(ii)

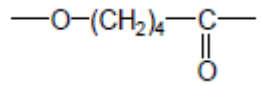


Must have trailing bonds, but ignore n.

1

OR –$OCH_2CH_2CH_2CH_2CO$– **OR** –$CH_2CH_2CH_2CH_2COO$–

Allow



but not - C_4H_{8-}

one unit only

Condensation

1

(b)

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	Tollens'	Fehling's / Benedicts	Acidified potassium dichromate

Penalise wrong formula for Tollens or missing acid with potassium dichromate but mark on.

1

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

Ignore 'clear', 'nothing'.

Penalise wrong starting colour for dichromate.

1

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

1

J Two (peaks)

Allow trough, peak, spike.

1

K Four (peaks)

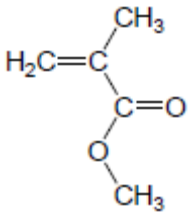
Ignore details of splitting.

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

1

(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 $H_2C=C(CH_3)COOCH_3$

All $C_5H_8O_2$ L to P must have C=C.

Allow CH_3–.

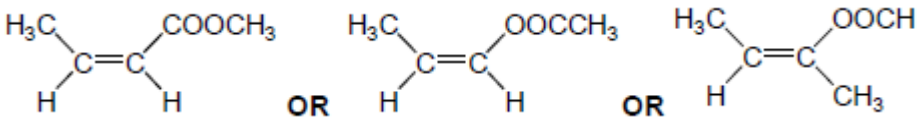
Allow $-CO_2CH_3$ etc.

Allow $CH_2C(CH_3)COOCH_3$.

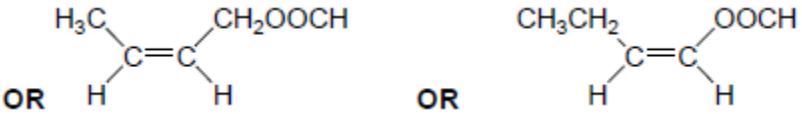
1

M
ester

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$CH_3CH=CHCOOCH_3$ $CH_3CH=CHOOCCH_3$ $CH_3CH=C(CH_3)OOCH$



$CH_3CH=CHCH_2OOCH$ $CH_3CH_2CH=CHOOCH$

Allow either E–Z isomer.

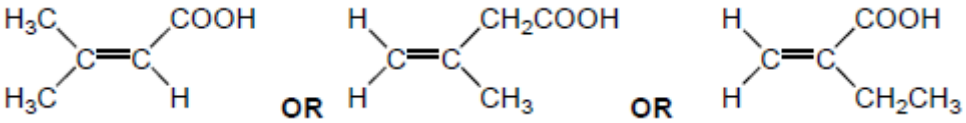
Allow CH_3- or C_2H_5- but not CH_2CH_3-.

Allow $CH_3CHCHCOOCH_3$ etc.

1

N

acid



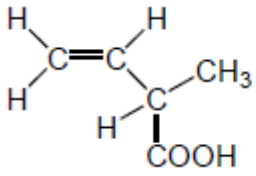
$(CH_3)_2C=CHCOOH$ $H_2C=C(CH_3)CH_2COOH$ $H_2C=C(COOH)CH_2CH_3$

Allow CH_3- or C_2H_5- but not CH_2CH_3-.

Allow $-CO_2H$.

Not cyclic isomers.

Not the optically active isomer.



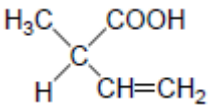
which is P anyway

Allow $(CH_3)_2CCHCOOH$ etc.

1

P

acid



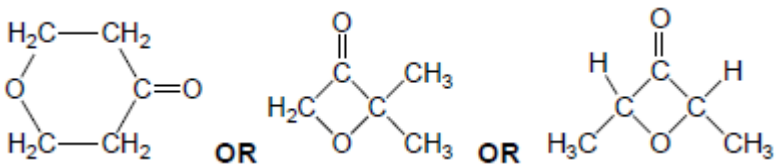
Allow $-CO_2H$.

$CH_3CH(COOH)CH=CH_2$

Allow $CH_3CH(CO_2H)CHCH_2$ or $CH_3CH(CO_2H)C_2H_3$.

1

Q



Not cyclic esters.

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[19]

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