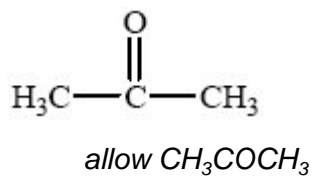


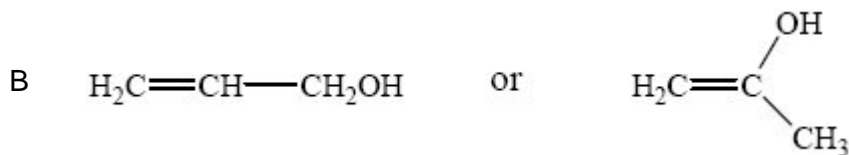
Mark schemes

1

(a) A



1

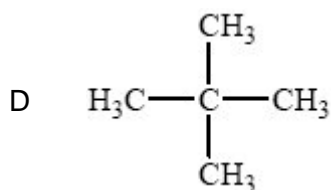


must show C=C
Penalise sticks once per pair

1

(b) C $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$

1



NOT cyclopentane which is only C₅H₁₀
Penalise sticks once per pair

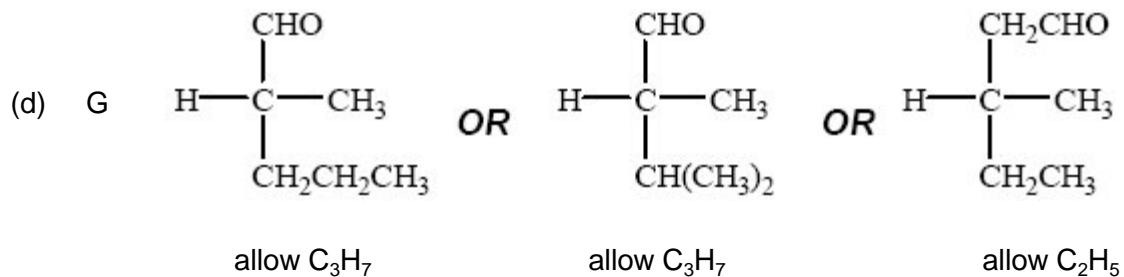
1

(c) E $\text{CH}_3\text{CH}_2\text{COOCH}_3$
Allow C₂H₅CO₂CH₃

1

F $\text{CH}_3\text{COOCH}_2\text{CH}_3$
Allow CH₃CO₂CH₂CH₃ or CH₃CO₂C₂H₅
Penalise sticks once per pair

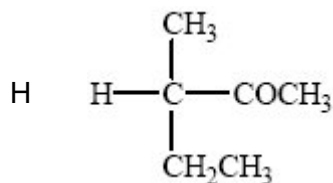
1



not C₅H₁₁ nor C₄H₉

Penalise sticks once per pair

1



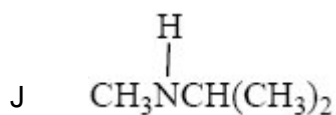
allow C₂H₅

1



allow C₂H₅

1



NOT C₃H₇

Penalise sticks once per pair

1

[10]

2

(a) GLC or distillation

1

(b) C=O

1

(c) (i) Cl has two isotopes 1

(ii) $\text{CH}_3 \overset{+}{\text{C}} = \text{O}$ 1



(d) (i) e.g. CDCl_3 or CCl_4 1

(ii) $\text{Si}(\text{CH}_3)_4$ 1

(e) 0 and 3 1



(g) $\text{CH}_3\text{CH}_2\text{CH}_2\text{COCl}$ or $(\text{CH}_3)_2\text{CHCOCl}$ 1

[10]

3

(a) (i) There are three pairs of equivalent carbon atoms 1

(ii) 75ppm 1

(b) (i) 4 1

(ii) 2 1

(c) Each structure can represent a pair of cis/Z and trans/E isomers
OR
Optical isomers 1

[5]

Allow a mark for identifying correct dibromocompound with three peaks even if integration ratio is wrong

1

if 6:3:1 missing or wrong, no marks for splitting

Only award a mark for splitting if it is clear which integration number it refers to

6 singlet or drawn

1

3 doublet or drawn

1

1 quartet/quadruplet or drawn

1

(max 10 marks)

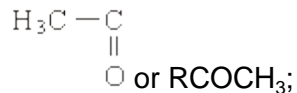
[16]

5

[1]

6

(a) (i)



(or description in words)
(ignore trailing bonds)

1

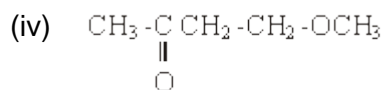
(ii) $\text{H}_3\text{C}-\text{O}$ or ROCH_3 ;

(allow 1 if both (i) and (ii) give CH_3- or $\text{H}_3\text{C}-$ only)

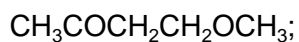
1

(iii) CH_2CH_2 or two adjacent methylene groups;

1



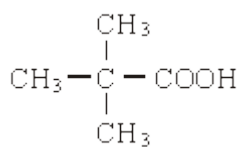
OR



1

(b) (i) OH in acids or (carboxylic) acid present

(ii)



(c)

reagent	$\text{K}_2\text{Cr}_2\text{O}_7 / \text{H}^+$	$\text{KMnO}_4 / \text{H}^+$
Y	no reaction	no reaction
Z	orange to green or turns green	purple to colourless or turns colourless

5

[9]

7

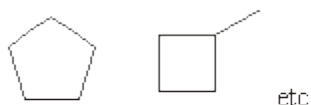
[1]

8

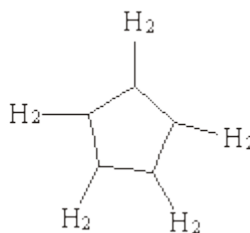
(a) **A** any C_5 alkene

1

B

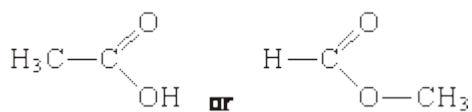


penalise



1

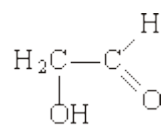
(b) **C**



or CH_3COOH or HCOOCH_3

1

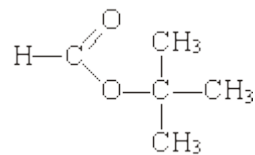
D



or HOCH₂CHO

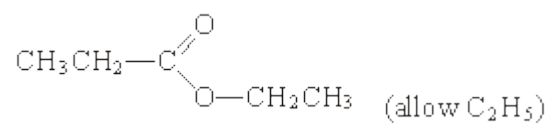
1

(c) **E**



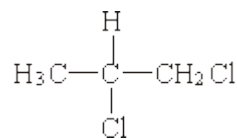
1

F



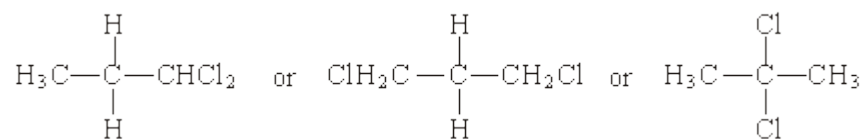
1

(d) **G**



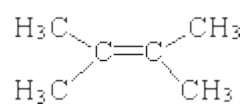
1

H



1

(e) I



1

J



1

[10]