

- M1. (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
- $\text{C}_4\text{H}_7\text{ClO}^- \rightarrow \text{CH}_3 \overset{+}{\text{C}} = \text{O} + \text{C}_2\text{H}_4\text{Cl}^-$ 1
- (d) (i) e.g. CDCl_3 or CCl_4 1
- (ii) $\text{Si}(\text{CH}_3)_4$ 1
- (e) 0 and 3 1
- (f)
- $$\begin{array}{c} \text{CH}_3 - \text{C} - \text{CH} - \text{CH}_3 \\ \parallel \quad | \\ \text{O} \quad \text{Cl} \end{array}$$
- 1
- (g) $\text{CH}_3\text{CH}_2\text{CH}_2\text{COCl}$ or $(\text{CH}_3)_2\text{CHCOCl}$ 1

[10]

M2.B

[1]

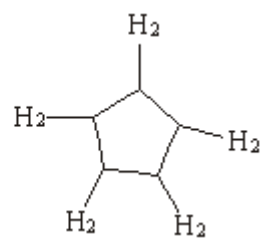
M3. (a) A any C₅ alkene

1

B

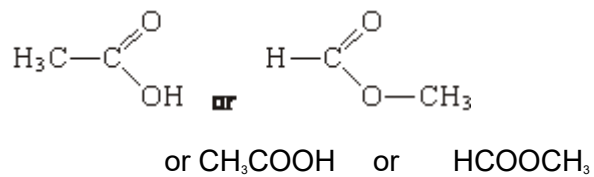


penalise



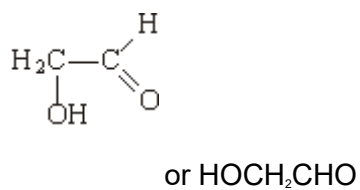
1

(b) C



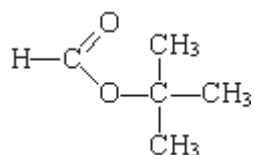
1

D



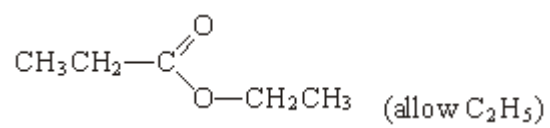
1

(c) E



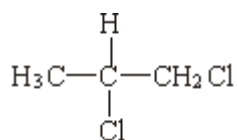
1

F



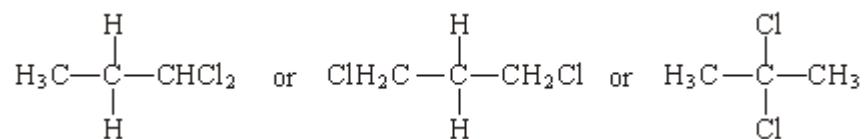
1

(d) **G**



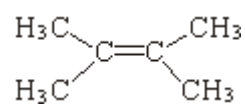
1

H



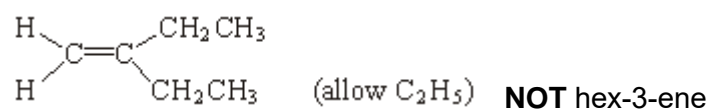
1

(e) **I**



1

J



1

[10]

M4. (a) Pentan-2-one

1

(b) (i) 1680 – 1750 (cm⁻¹)

1

(ii) 3230 – 3550 or 1000 – 1300 (cm⁻¹)

1

(iii) 4

1

(c)

Reagent	K ₂ Cr ₂ O ₇ /H ⁺	KMnO ₄ /H ⁺	Na	CH ₃ COOH/ H ₂ SO ₄	1
with C	no reaction	no reaction	no reaction	no reaction	1
with D	goes green	goes colourless	effervescence	smell	1

(penalise incomplete reagent e.g. K₂Cr₂O₇ or Cr₂O₇²⁻/H⁺ then mark on)

(d)

Reagent	Tollens	Fehlings or Benedicts	1
with E	silver (mirror)	red ppt or goes red (not red solution)	1

[9]

M5. (a) X (O-H) (alcohols)

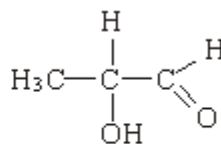
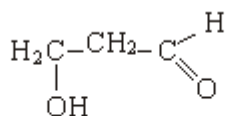
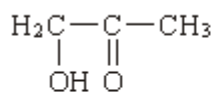
penalise acid or missing "alcohol"

1

Y C=O

allow carbonyl

1

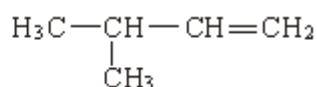
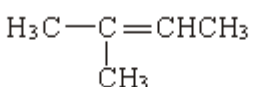
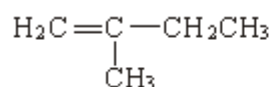


A

NOT acid

4

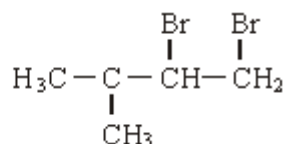
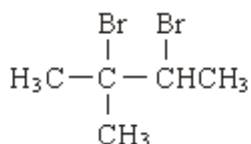
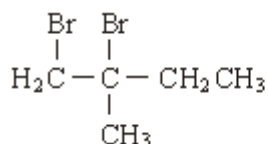
(b)



Allow consequ dibromocompounds following incorrect unbranched alkenes

NOT allow dibromocompound consequent on a duplicate alkene

NOT allow monobromocompounds if HBr added



3

3

6:3:1 either next to correct structure or to none

1

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]