

M1.D

[1]

M2. (a) X (O-H) (alcohols)

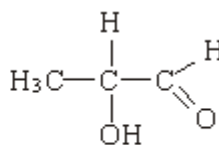
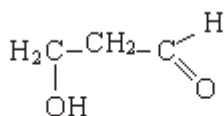
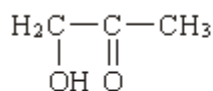
penalise acid or missing "alcohol"

1

Y C=O

allow carbonyl

1

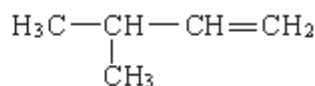
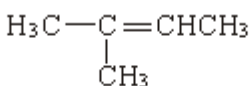
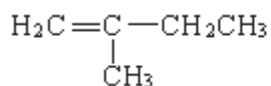


A

NOT acid

4

(b)

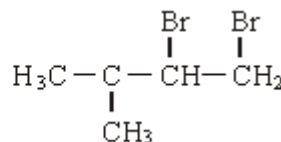
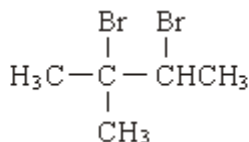
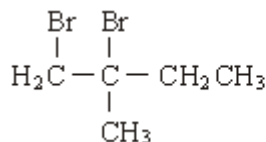


Allow consequ dibromocompounds following incorrect unbranched alkenes

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

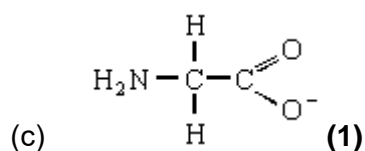
6 singlet or drawn	1
3 doublet or drawn	1
1 quartet/quadruplet or drawn	1
	(max 10 marks)

[16]

M3.D

[1]

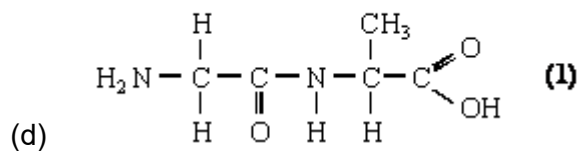
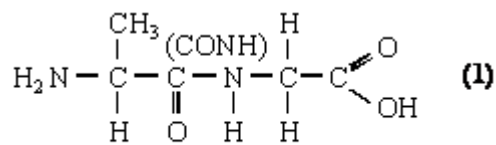
- M4. (a) 2-amino(e) propanoic acid (1) 1
- (b) (i) molecules with same structure / structural formula (1)
but with bonds (**atoms or groups**) arranged differently in space (3D) (1)
- (ii) Plane polarised light (1)
Rotated (equally) in opposite directions (1) 4



allow $\text{H}_2\text{NCH}_2\text{COO}^-$

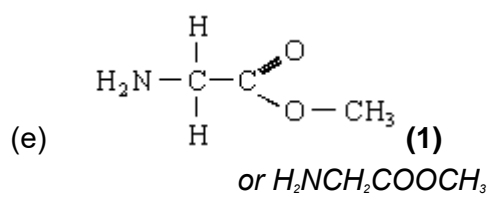
Penalise NH_2^- and OH^- once per paper
but CH_3^- is allowed

1



Not anhydrides; not repeating units

2



1

[9]

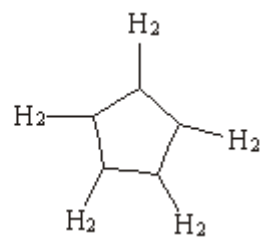
M5. (a) **A** any C₅ alkene

1

B

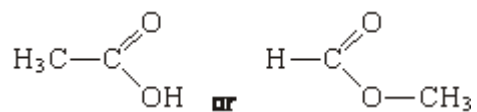


penalise



1

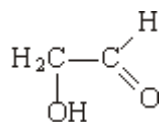
(b) **C**



or CH_3COOH or HCOOCH_3

1

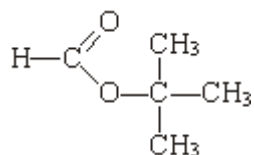
D



or HOCH_2CHO

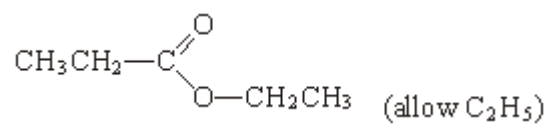
1

(c) **E**



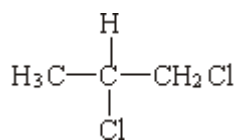
1

F



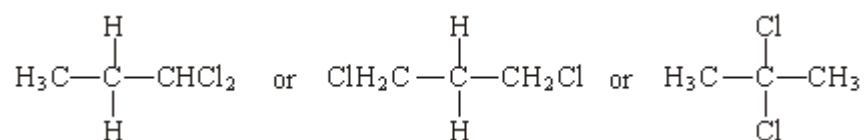
1

(d) **G**



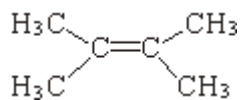
1

H



1

(e) **I**



1

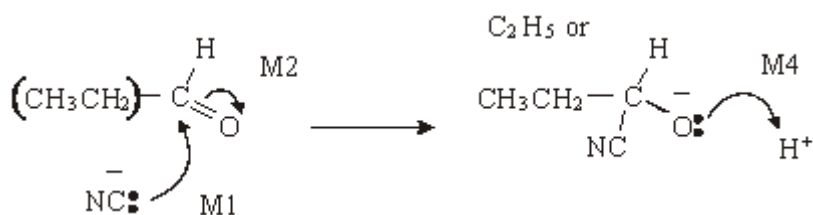
J



1

[10]

M6. (a) nucleophilic addition;



1

M3 structure;

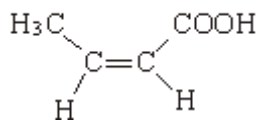
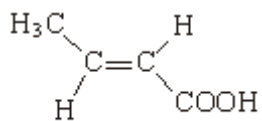
*(be lenient on position of charge on CN⁻)
 (M2 not allowed independent of M1,
 but allow M1 for correct attack on C⁺
 if M2 show as independent first.)
 (+on C of C=O loses M2 but ignore δ+ if correct)
 (M4 for arrow and lone pair (only allow for correct M3 or
 close))*

4

(b) (i) 2-hydroxybutanoic acid

1

(ii)

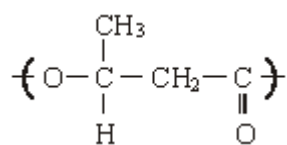


1

geometric(al) or cis-trans

1

(c) (i)



(one unit only) (ignore brackets or n) (trailing bonds are needed)

1

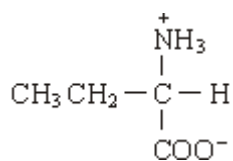
(ii) can be hydrolysed

OR

can be reacted with/attacked by acid/base/nucleophiles/H₂O/OH⁻;

1

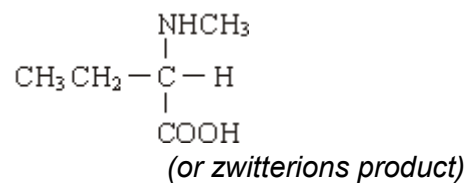
(d) (i)



(allow -NH₃⁺)

1

(ii)



1

(iii) nucleophilic substitution;

1

[14]