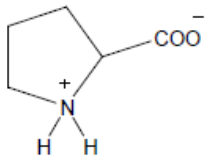
TOPIC 19 TEST MS

1. (a) (i)



Allow CO_2^- and NH_2^+

1

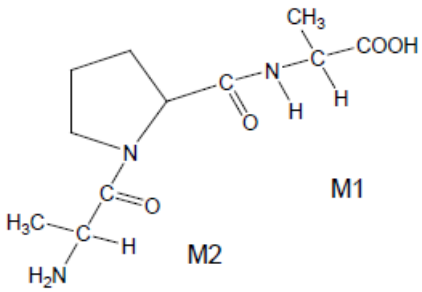
(ii) NOTE − **Two** marks for this clip

M1 for alanine section bonded through N

M2 for alanine section bonded through C

But penalise error in proline ring

1



Allow MAX 1 for correct tripeptide in polymer structure

1

(b) (i) 3-methylpent-2-ene

Ignore E-Z, commas, spaces or missing hyphens

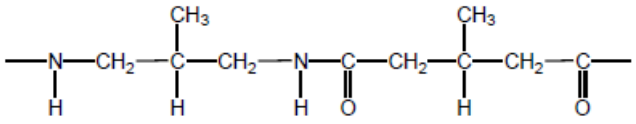
1

(ii) 4-amino-3-methylbutanoic acid

Ignore commas, spaces or missing hyphens

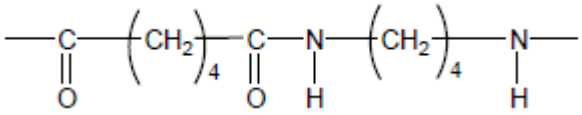
1

(iii)



or any polyamide section containing

8 carbons plus two C=O plus two N-H, such as



Trailing bonds are required

1

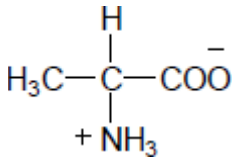
(iv) Non polar OR no polar groups / bonds (for attack by water / acids / alkalis / nucleophiles or for hydrolysis)

C-C bonds are strong

1

[7]

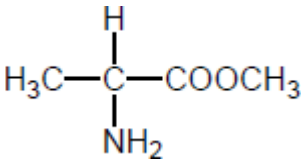
2. (a)



Allow $-NH_3^+$ and $^+NH_3-$

1

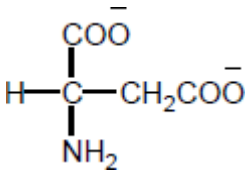
(b)



Allow protonated form, i.e. $-NH_3^+$ or $^+NH_3-$

1

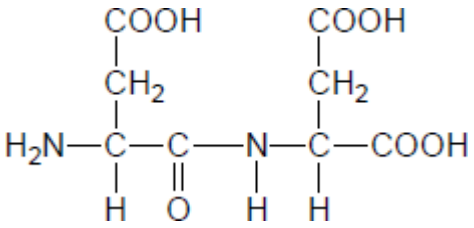
(c)



Allow – CO_2^-

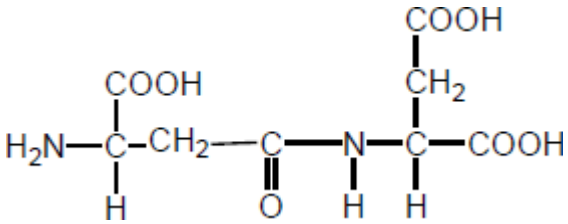
1

(d)



Allow zwitterion with any COO^-

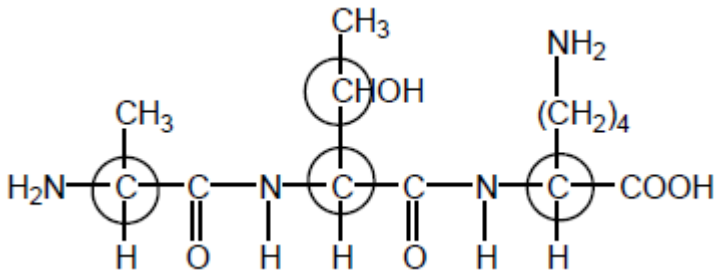
Allow use of "wrong" COOH



1

[4]

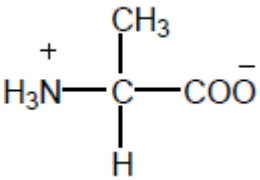
3. (a) (i)



These four only

1

(ii)



Allow − NH_3^+ and $^+NH_3^-$

1

(iii) 2-amino-3-hydroxybutanoic acid

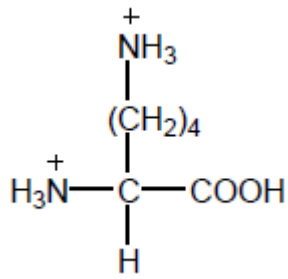
Ignore 1 in butan-1-oic acid

Do not penalise commas or missing hyphens

Penalise other numbers

1

(iv)



Allow $–NH_3^+$ and $^+NH_3^-$

1

(b) (i) Condensation

Allow polyester

1

(ii) propan**e**-1,3-diol

Must have e

*Allow 1,3-propan**e**diol*

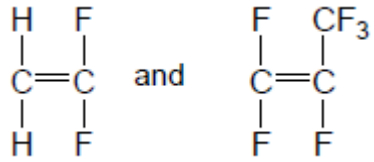
1

(c) (i) Addition

Not additional

1

(ii)

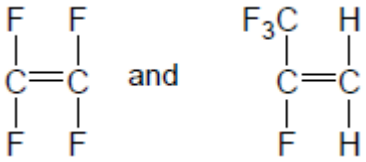


Allow monomers drawn either way round

Allow bond to F in CF_3

1

OR



1 for each structure within each pair

1

(d) c

If wrong, CE = 0

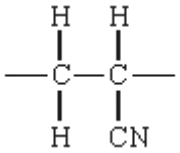
1

C-C or C-F bonds too strong

1

[11]

4. (a) (i)



(Ignore n or brackets, but trailing bonds are essential)

1

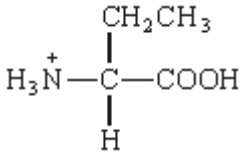
(ii) Addition or radical

1

(b) (i) 2-aminobutanoic (acid)

1

(ii)

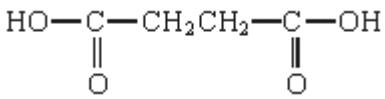


1

(c) (i) $C_3H_4O_2$

1

(ii)



1

(1,4-)butan(e)dioic (acid)

(allow succinic, but not dibutanoic nor butanedicarboxylic acid)

1

(iii) Can be hydrolysed / can react with acid or base or water / can react with nucleophiles

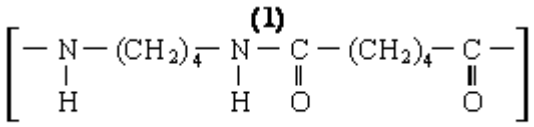
1

[8]

5. (a) 1, 4-diaminobutane or butane -1, 4-diamine **(1)**
A: $BrCH_2CH_2Br$ **or** $ClCH_2CH_2Cl$ **(1)**
B: $NC\ CH_2CH_2CN$
Step 1: Br_2 or Cl_2 **(1) (ignore aq)**
Step 2: KCN **(1) (NOT HCN)**
Step 3: H_2 / Ni **or** $LiAlH_4$ **or** Na / C_2H_5OH **(1) (NOT $NaBH_4$)**
Hydrogenation only for H_2 / Ni, **or** nucleophilic addition only for $LiAlH_4$**(1)**

OR reduction or addition

7



(1)

(b) **(1)**

QL hydrogen bonding **(1)**

Polarity of H-bonding shown or discussed **(1)**

4

(c) Polyamides / peptide link can be hydrolysed **(1)**

OR polyalkenes cannot be hydrolysed

QL OH^- attacks peptide link or $C^{\delta+}$ **(1)**

poly(ethene) non-polar **(1)**

3

[14]

6. D

[1]

7. B

[1]

8. B

[1]

9. A

[1]

10. C

[1]

11. C

[1]