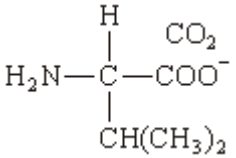
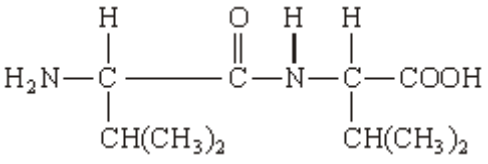
M1. (a) (i)  **(1)**

ignore Na^+ unless covalently bonded

(ii)  **(1)**

must be dipeptide, not polymer nor anhydride
allow –CONH– or –COHN–
allow zwitterion

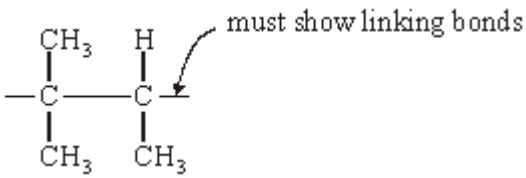
(iii) <u>hydrogen bonding</u> **(1)**

QL

Allow with dipole-dipole or v derWaals, but not dipole-dipole etc alone

3

(b) (i) *Type of polymerisation*: addition(al) **(1)**

Repeating unit: 

(1)

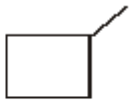
not multiples
allow n

(ii) $CH_3CH=CHCH_2CH_3$ **(1)** C_2H_5

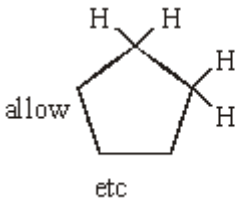
(iii)

(1)

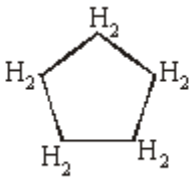
or



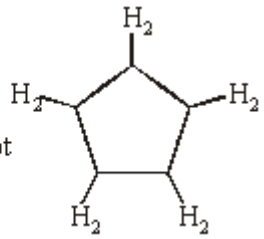
etc



or



but not



4

[7]

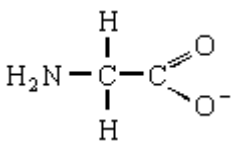
M2. (a) 2-amino(e) propanoic acid **(1)**

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

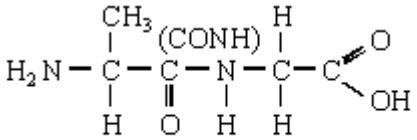
(c) 

(1)

allow $H_2NCH_2COO^-$

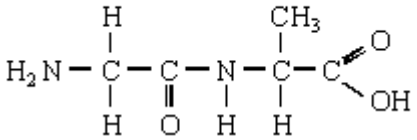
Penalise NH_2^- and OH^- once per paper
but CH_3- is allowed

1



(1)

(d)

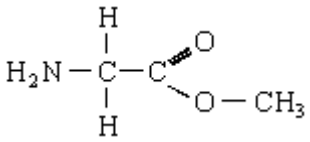


(1)

Not anhydrides; not repeating units

2

(e)



(1)

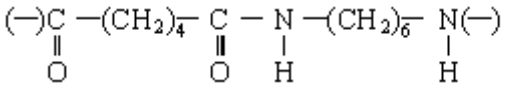
or $H_2NCH_2COOCH_3$

1

[9]

M3. (a) (i) hexane-1,6-diamine or 1,6-diaminohexane **(allow ammine)** or 1,6 hexan(e)diamine **(1)**

(ii)

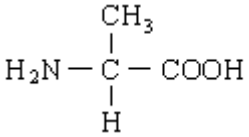


(1)

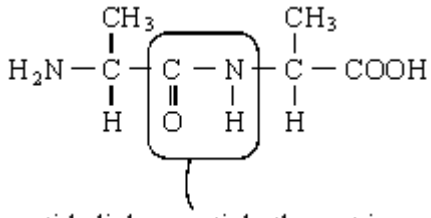
Allow –CONH–

2

(b) (i)



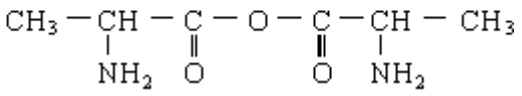
(1)



(1)

peptide link essential : the rest is consequential on b(i)
(allow CONH)

allow anhydride

(ii) 

2

(c) (i) <u>quaternary ammonium bromide salt</u> **(1)**

(not ion, not compound)

Allow quarternery

(ii) *Reagent*: CH_3Br or bromomethane **(1)**

penalise CH_3Cl but allow excess for any halo<u>methane</u>

Condition: excess (CH_3Br) **(1)**

(iii) nucleophilic substitution **(1)**

4

[8]