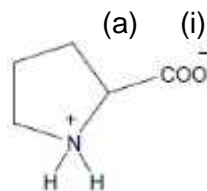




**TOPIC 19 TEST MS**

1.

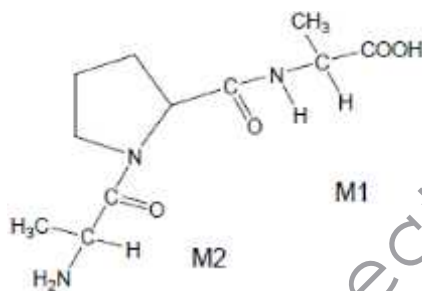


Allow  $\text{CO}_2^-$  and  $\text{NH}_2^+$

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

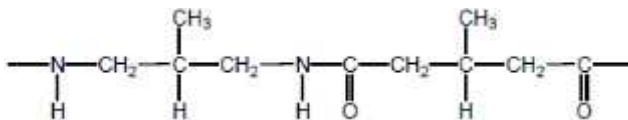
1

- (b) (i) 3-methylpent-2-ene  
*Ignore E-Z, commas, spaces or missing hyphens*

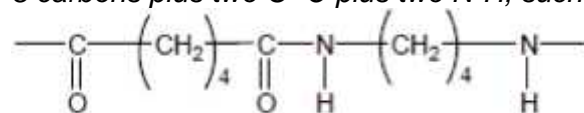
1

- (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*



1


**MEGA LECTURE**

*Trailing bonds are required*

1

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

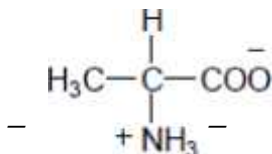
C-C bonds are strong

1

[7]

2.

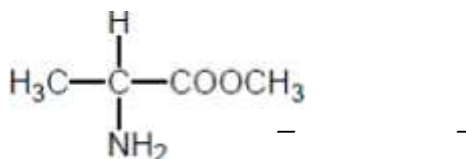
(a)



*Allow  $\text{NH}_3^+$  and  $+\text{NH}_3$*

1

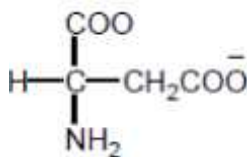
(b)



*Allow protonated form, i.e.  $\text{NH}_3^+$  or  $+\text{NH}_3$*

1

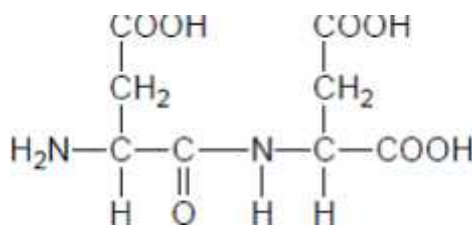
(c)



*Allow  $-\text{CO}_2^-$*

1

(d)

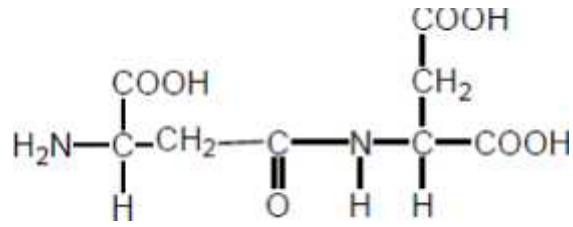


*Allow zwitterion with any COO*

*Allow use of "wrong" COOH*

2

**MEGA LECTURE**



1

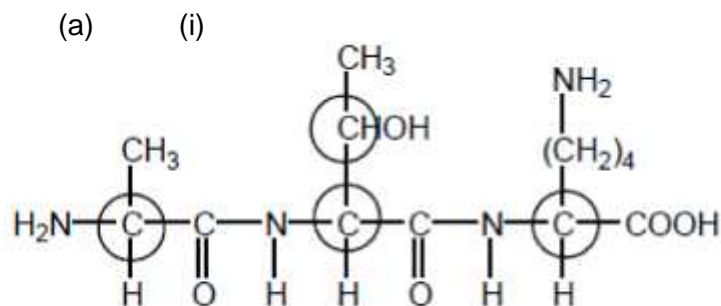
[4]

3.

[www.megalecture.com](http://www.megalecture.com)

3

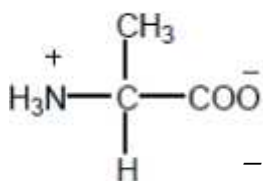
MEGA LECTURE



These four only

1

(ii)



Allow  $\text{NH}_3^+$  and  $^+\text{NH}_3$

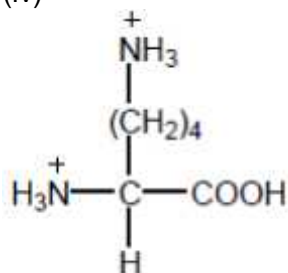
1

(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  $-\text{NH}_3^+$  and  $^+\text{NH}_3$

1

(b) (i) Condensation  
Allow polyester

1



- (ii) propane-1,3-diol  
*Must have e*  
*Allow 1,3-propanediol*

1

[www.megalecture.com](http://www.megalecture.com)

**MEGA LECTURE**

(c) (i) Addition

*Not additional*

1

(ii)



*Allow monomers drawn either way round*

*Allow bond to F in CF<sub>3</sub>*

1

**OR**



*1 for each structure within each pair*

1

(d) c

*If wrong, CE = 0*

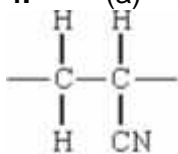
1

C-C or C-F bonds too strong

1

[11]

4. (a) (i)



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

1

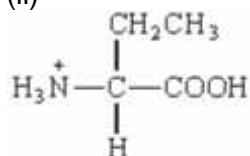
(ii) Addition or radical

1

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

1

(ii)

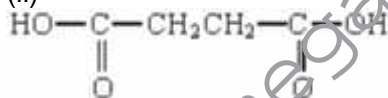


1

(c) (i)  $\text{C}_3\text{H}_4\text{O}_2$

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:  $\text{BrCH}_2\text{CH}_2\text{Br}$  or  $\text{ClCH}_2\text{CH}_2\text{Cl}$  (1)

B:  $\text{NCCH}_2\text{CH}_2\text{CN}$

Step 1:  $\text{Br}_2$  or  $\text{Cl}_2$  (1) (ignore aq)

7

**MEGA LECTURE**

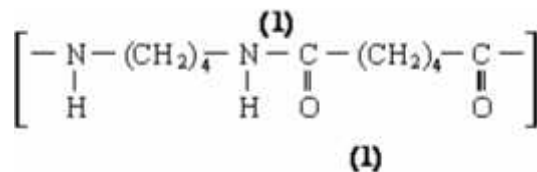
Step 2: KCN **(1)** (**NOT HCN**)

Step 3: H<sub>2</sub> / Ni **or** LiAlH<sub>4</sub> **or** Na / C<sub>2</sub>H<sub>5</sub>OH **(1)** (**NOT NaBH<sub>4</sub>**)

Hydrogenation only for H<sub>2</sub> / Ni, **or** nucleophilic addition only for LiAlH<sub>4</sub> **(1)**

*OR reduction or addition*

7



(b)

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<sup>-</sup> attacks peptide link or C<sup>δ+</sup> **(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]