CHEMISTRY ONLINE
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CHEMISTRY

ORGANIC CHEMISTRY II

Level & Board	AQA (A-LEVEL)
TOPIC:	POLYMERS
PAPER TYPE:	SOLUTION - 1
TOTAL QUESTIONS	10
TOTAL MARKS	/27

Polymers - 1

1.

(a)

To prepare ethyl butanoate from butanoic acid and ethanol:

$CH_3CH_2CH_2COOH + CH_3CH_2OH \rightarrow CH_3CH_2CH_2COOCH_2CH_3 + H2O$

In this reaction:

$CH_3CH_2CH_2COOH$ (butanoic acid) reacts with CH_3CH_2OH (ethanol).

The product is $CH_3CH_2CH_2COOCH_2CH_3$ (ethyl butanoate) and water (H_2O).

The catalyst used for this reaction is concentrated sulfuric acid H_2SO_4.

(4)

(b)

The balanced equation for the preparation of butyl ethanoate:

$CH_3CH_2CH_2CH_2OH + (CH_3CO)_2O \rightarrow CH_3COOCH_2CH_2CH_2CH_3 + CH_3COOH$

(3)

2. A

(1)

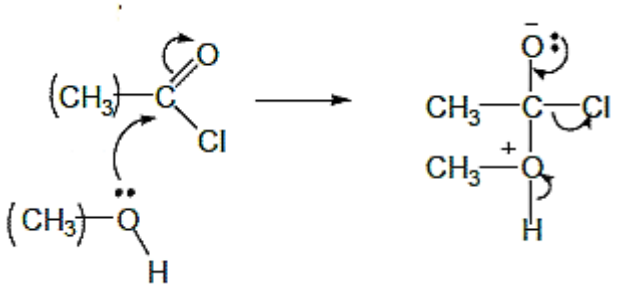
3.

Name of the mechanism:

Nucleophilic addition-elimination

Mechanism:

I am Sorry !!!!!



Product:

CH_3COOCH_3

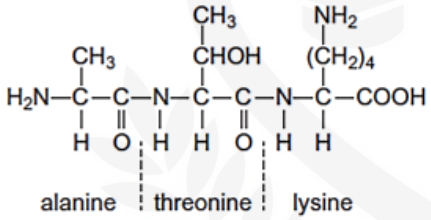
(5)

4. **A**

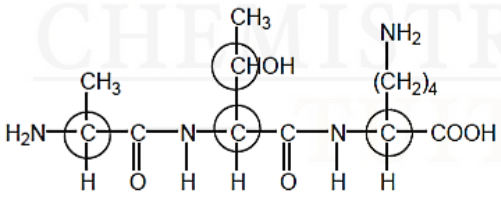
(1)

5.

(a)



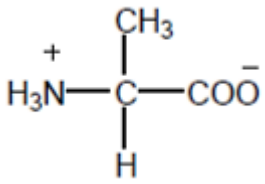
Asymmetric carbon atoms in the tripeptide are indicated as circle around each of the.



(1)

(b)

Zwitterion of alanine:



(1)

(c)

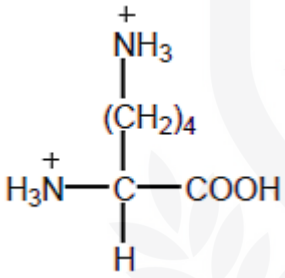
IUPAC name of threonine:

2-amino-3-hydroxybutanoic acid

(1)

(d)

This ion is formed by lysine at low pH.



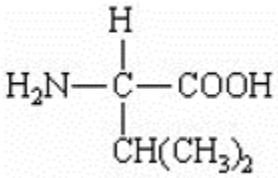
(1)

6. **A**

(1)

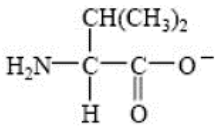
7.

Consider the following amino acid.



(a)

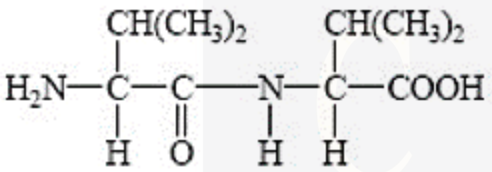
The structure of the amino acid present in a solution at pH 12:



(1)

(b)

The structure of the dipeptide:



(1)

(c) *Protein chains are often arranged in the shape of a helix.*

Name the type of interaction that is responsible for holding the protein chain in this shape.

The type of interaction responsible for holding protein chains in a helical shape is ***hydrogen bonding****.*

Explanation:

So, these hydrogen bonds form between the carbonyl oxygen (C=O) of one amino acid and the amide hydrogen (N-H) of another amino acid in the backbone of the protein chain, typically occurring at regular intervals.

This pattern of hydrogen bonding stabilizes the helical structure, which is known as an ***alpha helix****.*

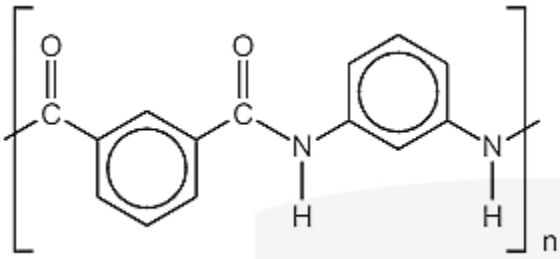
(1)

8. A

(1)

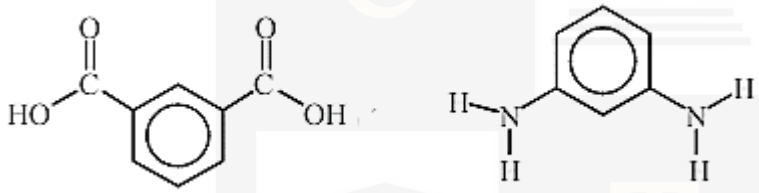
9.

The repeat unit of Nomex is:



(a)

Following are the two monomers that could be used to form Nomex.



(2)

(b)

Nomex has a higher melting point than nylon due to stronger intermolecular forces.

This includes:

Greater hydrogen bonding due to its structure.
Planar aromatic rings allowing tighter packing and stronger van der Waals forces.
π-π interactions between aromatic rings.

(1)

10. C

(1)

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