Practice Question Set For A-Level
Subject : Chemistry
Paper-2 Topic: AminoAcids, Proteins & DNA

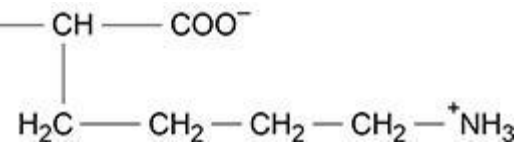
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Name of the Student:_____
Max. Marks : 17 Marks **Time : 17 Minutes**

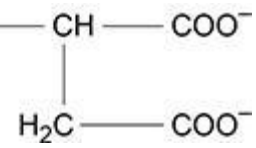
Q1.

Which structure shows a zwitterion of an amino acid?

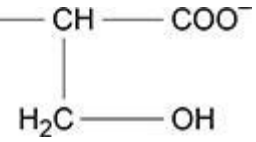
A



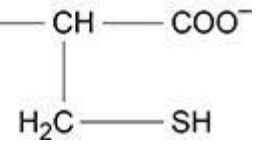
B



C



D



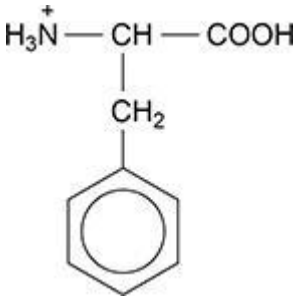
(Total 1 mark)

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Q2.

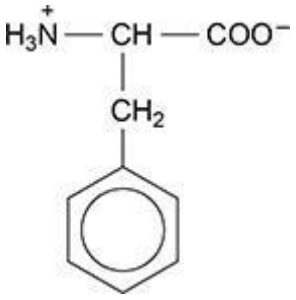
Which structure is formed by phenylalanine in solution at pH = 3?

A



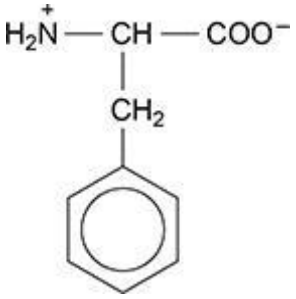
○

B



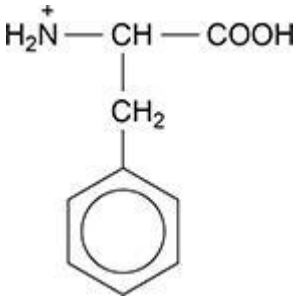
○

C



○

D



○

(Total 1 mark)

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Q3.

Endomorphin-2 is a peptide with the amino acid sequence shown.

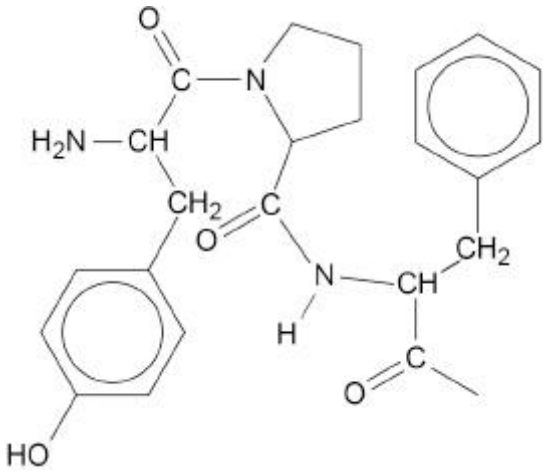
Tyr–Pro–Phe–Phe–NH_2

Each amino acid is represented by a three-letter abbreviation.

Tyr = tyrosine Pro = proline Phe = phenylalanine

Figure 1 shows part of the structure of endomorphin-2, showing the Tyr–Pro–Phe– part of the molecule.

Figure 1



(a) The $–NH_2$ at the end of the amino acid sequence of endomorphin-2 shows that the terminal functional group is an amide, not an acid.

Complete the structure of endomorphin-2 in **Figure 1**.

(2)

(b) Use the structure in **Figure 1** to draw the skeletal formula of proline, Pro.

(1)

A student hydrolyses a sample of endomorphin-2 to break it down into its constituent amino acids.

The student analyses the resulting mixture by thin-layer chromatography, TLC.

(c) State a reagent and the conditions needed for the hydrolysis.

Reagent _____

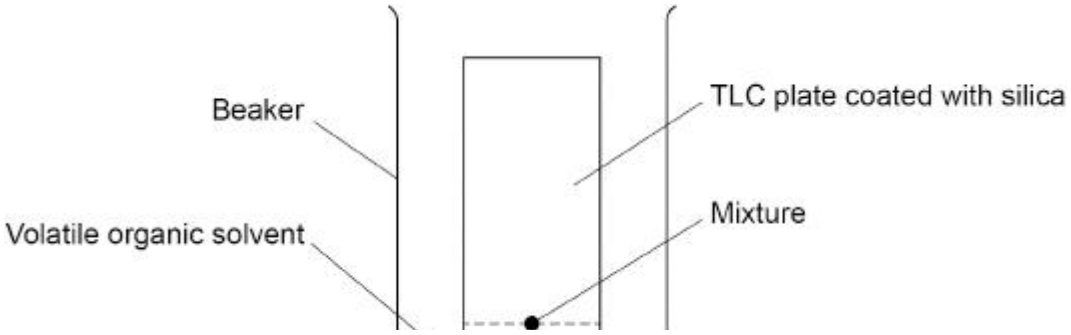
Conditions _____

(2)

(d) **Figure 2** shows the apparatus used for the TLC.

Figure 2

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There is a piece of the apparatus missing from **Figure 2**. This omission will result in an inaccurate chromatogram.

Identify the missing piece of the apparatus.

State and explain why this piece of the apparatus is needed.

Missing piece _____

Explanation _____

_____

_____

_____

(3)

(e) State why the amino acids separate on the TLC plate.

_____

_____

_____

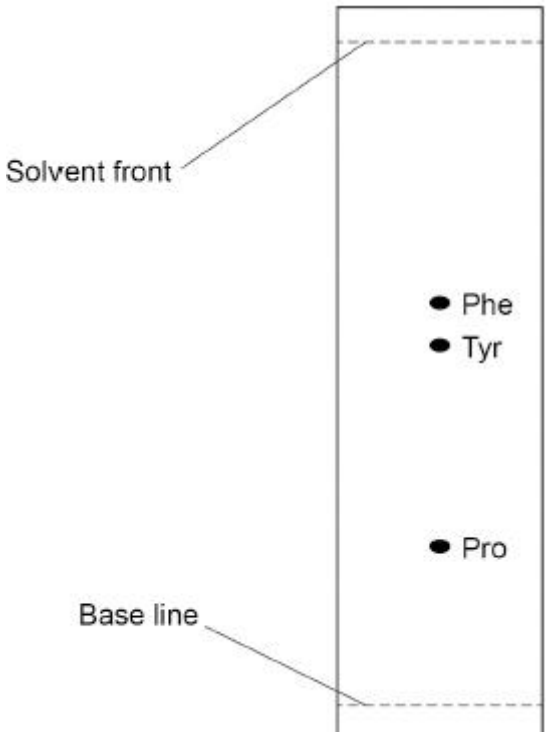
(1)

When the solvent has risen up the TLC plate, the student removes the plate from the beaker and sprays it with a developing agent.

Figure 3 shows the result.

Figure 3

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(f) Name a suitable developing agent.

State why the developing agent is needed.

Name _____

Why needed _____

_____

_____

(2)

(g) Determine the R_f value for Tyr.

R_f _____

(1)

(Total 12 marks)

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Q4.

Which statement about enzymes is **not** correct?

A The tertiary structure of an enzyme influences which molecules can bind to the active site. ⬭

B The action of enzymes can be inhibited by a molecule or ion that binds to the active site. ⬭

C Enzymes work equally well on both optical isomers of a substrate. ⬭

D Computers can be used to design drugs to block active sites on enzymes. ⬭

(Total 1 mark)

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Q5.

Cisplatin has the formula $[Pt(NH_3)_2Cl_2]$
Cisplatin is an anti-cancer drug that prevents replication of DNA.

When cisplatin bonds to DNA, which is the correct ligand replacement reaction?

A replacement of one NH_3 ligand ⬭

B replacement of two NH_3 ligands ⬭

C replacement of one NH_3 ligand and one Cl^- ligand ⬭

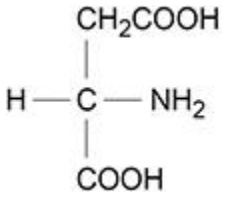
D replacement of two Cl^- ligands ⬭

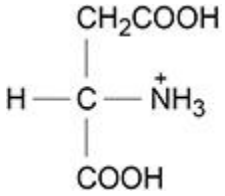
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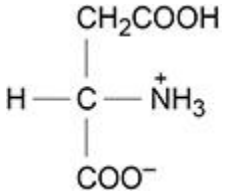
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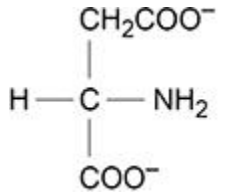
Q6.

Which is the main species present in an aqueous solution of aspartic acid at pH = 14?

A  ⬭

B  ⬭

C  ⬭

D  ⬭

(Total 1 mark)

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