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

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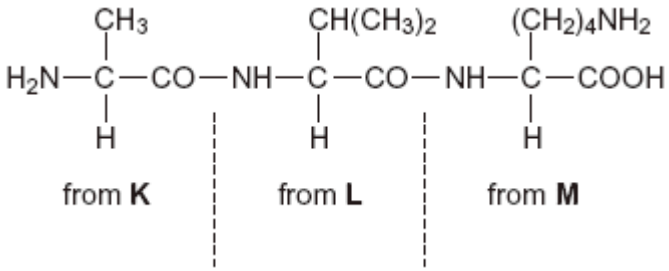
Name of the Student:_____
Max. Marks : 20 Marks **Time : 20 Minutes**

Q1.

(a) Consider the tripeptide shown below that is formed from three amino acids, **K**, **L** and **M**.



(i) Name the process by which the tripeptide is split into three amino acids.

_____

(1)

(ii) Give the IUPAC name for the amino acid **K**.

_____

(1)

(iii) Draw the structure of the zwitterion of amino acid **L**.

(1)

(iv) Draw the structure of the species formed by amino acid **M** at low pH.

(1)

(b) Consider the amino acid serine.

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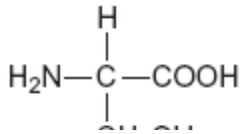

(i) Draw the structure of the product formed when serine reacts with an excess of CH_3Br

(1)

(ii) Draw the structure of the dipeptide formed by two molecules of serine.

(1)
(Total 6 marks)

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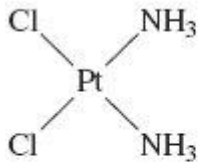
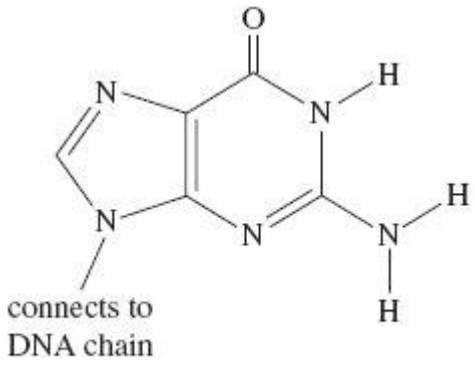
Q2.

The complex cisplatin acts as an anticancer drug by changing the properties of DNA when it reacts with guanine, a component of DNA.



cisplatin



guanine

When cisplatin is absorbed into the human body, it undergoes a ligand substitution reaction and one chloride ligand is replaced by a water molecule forming a complex ion **Q**.

(a) Write an equation for this substitution reaction to form the complex ion **Q**.

_____

(2)

(b) The complex ion **Q** can bond to guanine in two different ways.

(i) The first way involves a hydrogen atom, from one of the ammonia ligands on **Q**, bonding to an atom in a guanine molecule. State the type of bond formed to guanine and identify an atom in guanine that could form a bond to this hydrogen atom.

Type of bond _____

Atom in guanine _____

(2)

(ii) The second way involves a ligand substitution reaction in which an atom in a guanine molecule bonds to platinum by displacing the water molecule from **Q**.
State the type of bond formed between guanine and platinum when a water molecule is displaced and identify an atom in guanine that could bond to platinum in this way.

Type of bond _____

Atom in guanine _____

(2)

(c) State and explain **one** risk associated with the use of cisplatin as an anticancer drug.

Risk _____

Explanation _____

(2)

(Total 8 marks)

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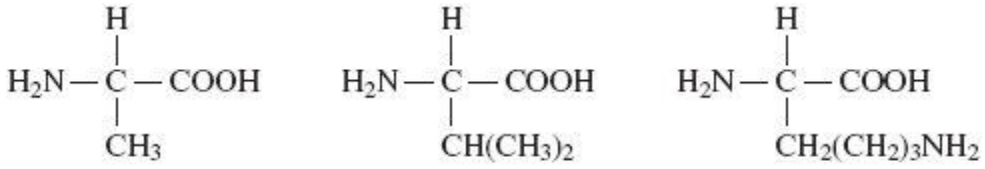
Q3.

The three amino acids shown below were obtained by hydrolysis of a protein.



alanine

valine

lysine

(a) (i) Draw the zwitterion of alanine.

(1)

(ii) Draw the species formed when valine is dissolved in an alkaline solution.

(1)

(iii) Draw the species formed by lysine at low pH.

(1)

(b) Draw the two dipeptides formed by the reaction of alanine with valine.

(2)

(c) Name a suitable method by which the mixture of amino acids formed by hydrolysis of the protein can be separated.

_____

(1)

(Total 6 marks)

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