



Question One: (4 marks)

a) Lipids are vital for the human body, what are the most important **functions** they serve? (2 marks)

- * _____
- * _____
- * _____
- * _____

b) Explain why lipids are predominantly **hydrophobic**. (2 marks)

Question Two: (9 marks)

a) Both carbohydrates and lipids provide energy for the body, explain why lipids contain more energy **per gram** than carbohydrates. (2 marks)

b) Why does cellulose form **fibrous** structure? (2 marks)

c) What is the relationship between the **melting point** and the degree of **unsaturation** of fatty acids? (2 marks)

d) A **saturated** fatty acid with 18 carbons is called -----.

e) Fatty acids form **ester** linkages with -----to produce -----

- (3 marks)



Question Three: (5 marks)

Glucose is broken down by glycolysis:

- a) **Glycolysis** provides the cell with ----- and -----
-----.
- b) **Pyroovate** could take three possible **fates**: -----
-, ----- and -----.
- c) Draw the structure of an **aldose** and a **ketose** of your choice:

Question Four: (5 marks)

- a) **Polypeptides** are made of amino acid residues linked together via -----
----- while **polysaccharides** are made of glucose monomers bonded together
by -----.
- b) **Secondary** structure of proteins is stabilised by ----- but the
forces used to stabilise the **tertiary** structure of proteins are -----
-, -----, -----, -----
-and -----.
- c) **Quaternary** protein structure involves two or more -----
- as well as a non-protein unit called -----.
- d) The **sequence** of amino acids in a peptide chain is determined by -----
-----.



Question Five: (11 marks)

a) compare between globular proteins and fibrous proteins giving examples for each:
(4 marks)

<i>Globular Proteins</i>	<i>Fibrous Proteins</i>

b) Explain why a very **small** change in the amino acid sequence of a huge protein could seriously affect its **function**: (2 marks)

c) Proteins are considered to be the work horse of the cell, state *four* major **functions** of proteins: (2 marks)

-----, -----
-----, -----

d) Amino acids exist as **stereoisomers** of L or D. This is caused by the fact that --
-----, the **only** amino acid that does
not demonstrate this property is ----- because it -----
----- . (2 marks)

e) What do the amino acids; **cysteine**, **cystine** and **methionine** all have in
common? (1 mark)



Question Six: (8 marks)

- a) **Unsaturated** fatty acids are made of carbon-carbon **double bonds** of ----- **configuration**. This will cause the hydrocarbon chain to ----- and therefore they wont pack together tightly as the ----- **forces** are weakened and as a result the ----- of the fatty acid will decrease causing it to be liquid at **room temperature**.
- b) The fatty acid; C:18, Δ 9,12 has ----- carbons and ----- double bonds on carbon numbers ----- & ----- . this fatty acid is called -----
- c) An Omega 3 (Ω 3) fatty acid contains -----.
- d) **Phospholipids** are complex lipids that contain a ----- head and a ----- tail. This lipid is a major component of -----.
- e) **lipase** is an enzyme that catalyses the **hydrolysis** of ----- to form glycerol and ----- . Glycerol will undergo enzymatic **phosphorylation** and **dehydrogenation** to be converted to ----- which will then join glycolysis to produce -----.

Question Seven: (8 marks)

Draw the structure of:

- a) A **dipeptide** made of **Asparagine** and **Tyrosine**, (name this dipeptide): (3 marks)



b) Lauric acid:
(1 mark)

c) An amino acid with a **chargeable** R group (basic):
(1 mark)

d) Cystine:
(2 mark)

e) Oleic acid:
(1 mark)

Good Luck