2.1 Metabolism & Water

Question Paper

Course	DP IB Biology
Section	2. Molecular Biology
Topic	2.1 Metabolism & Water
Difficulty	Easy

Time allowed: 60

Score: /43

Percentage: /100

Question 1a

a)
Define hydrophilic.

[1 mark]

[1 mark]

Question 1b

b)
State two advantages of a carbon atom being able to form four bonds to neighbouring atoms.

[2 marks]

[2 marks]

Question 1c

c)
List **three** carbon compounds that living organisms are based upon.

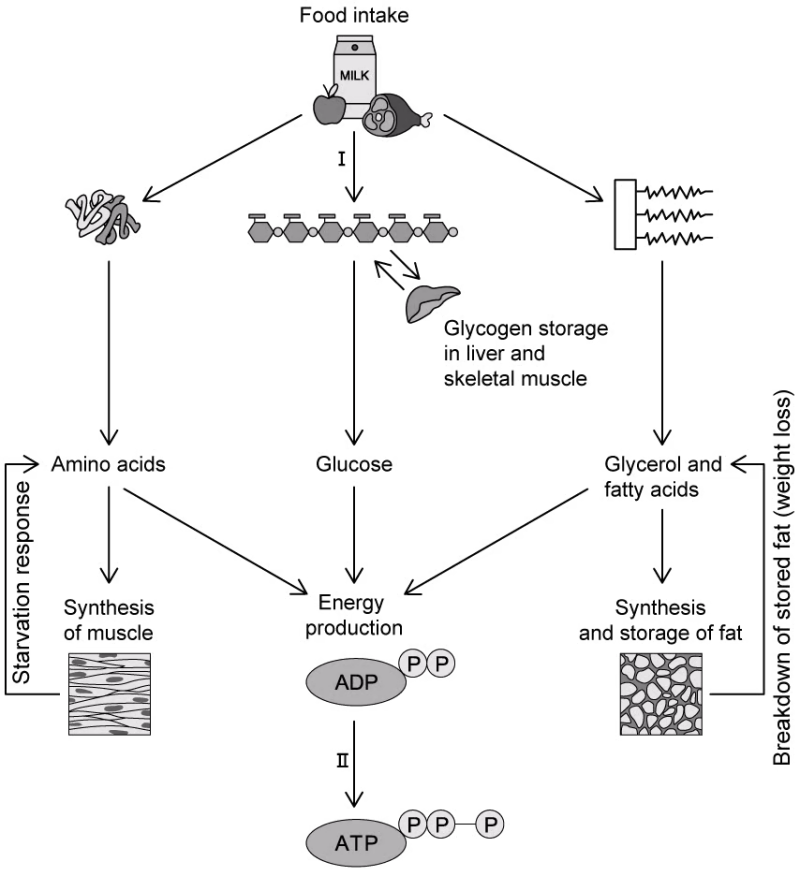
[3 marks]

[3 marks]

Question 1d

d)

State which part of metabolism is occurring at **II** in the flowchart below.



[1 mark]

[1 mark]

Question 2a

a)

State the aspect of the molecular behaviour of water that is used to explain why it is highly important to living organisms.

[1 mark]

[1 mark]

Question 2b

b)
Two of the properties of water are its **cohesive** and **adhesive** forces.

Describe how these properties are useful to living organisms.

[3 marks]

[3 marks]

Question 2c

c)
Both water and methane are small molecules containing single covalent bonds between their atoms.

State two differences between these two molecules that make their physical properties very different.

[2 marks]

[2 marks]

Question 2d

d)
List two physical properties, associated with their state of matter, that differ between water and methane.

[2 marks]

[2 marks]

Question 3a

a)
Define molecular biology.

[1 mark]

[1 mark]

Question 3b

b)
State the name of the compound that was synthesised artificially, providing evidence that living organisms are not required to produce organic compounds.

[1 mark]

[1 mark]

Question 3c

c)
Draw a labelled diagram of a water molecule.

[3 marks]

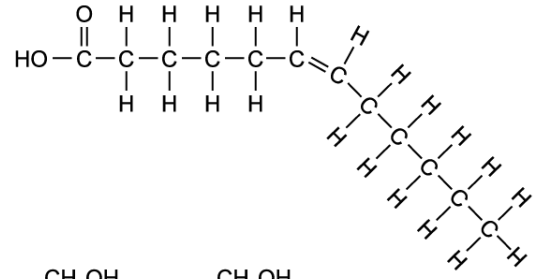
[3 marks]

Question 4a

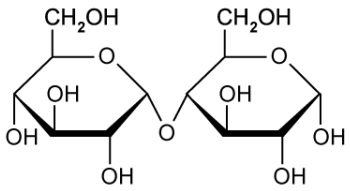
a)

Identify which of the diagrams below is a lipid, giving **one** reason why.

A



B



[2 marks]

[2 marks]

Question 4b

b)

Draw a molecular diagram of D-ribose.

[2 marks]

[2 marks]

Question 4c

c)

List, using simplified notation, two of the chemical groups found in a generalised amino acid.

[2 marks]

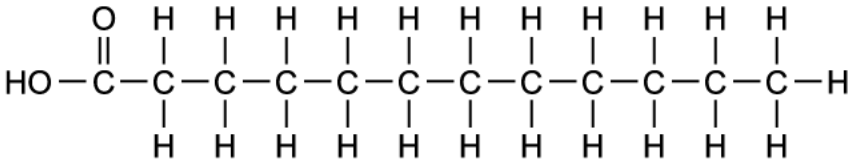
[2 marks]

Question 4d

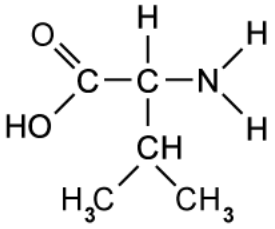
d)

State, giving one reason, which diagram shows the structure of a saturated fatty acid.

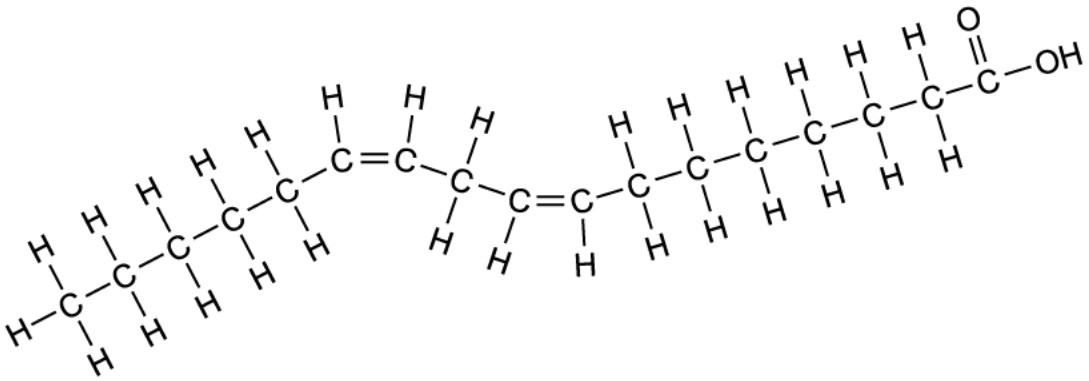
I



II



III



[2 marks]

[2 marks]

Question 5a

One mark is available for clarity of communication throughout this question.

a)
Outline the theory that states that organic molecules could only be derived from living systems.

[3 marks]

[3 marks]

Question 5b

b)
Distinguish between anabolic and catabolic reactions.

Include **one** example of each reaction.

[5 marks]

[5 marks]

Question 5c

c)
Describe the properties of water molecules that enable them to transport metabolites, using **four** named examples.

[7 marks]

[7 marks]