

2.1 Metabolism & Water

Question Paper

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

Time allowed: 20
Score: /10
Percentage: /100

Question 1

Which of the following sequences of atomic symbols best represents the makeup of the elements in the human body, **in descending order**, by mass?

- A** O, C, H, N, S, P
- B** C, H, O, N, S, P
- C** O, C, N, H, Na, K
- D** C, H, O, N, K, S

[1 mark]

Question 2

Which property of carbon makes it a good basis for organic molecules?

- A** It exists in hard and stable forms like graphite and diamond.
- B** It forms a varying number of covalent bonds to other atoms.
- C** It can form millions of different compounds in association with hydrogen and oxygen.
- D** It forms strong, ionic bonds with other atoms.

[1 mark]

Question 3

The four statements below are examples of the two types of metabolism, anabolism and catabolism.

- A Deamination of polypeptides to form urea.
- B Formation of glycosidic bonds between glucose and fructose.
- C Depletion of fat stores during a period of starvation.
- D Anaerobic respiration.

Which **one** of the statements represents a type of metabolism which is different to the other three options?

[1 mark]

Question 4

Which of the following are **not** examples of hydrogen bonding?

- A Base-pairing between two strands of DNA.
- B The forces that hold water molecules together.
- C The bond that joins one nucleotide to its neighbour in a strand of DNA.
- D Interactions between water and the polar R groups of certain amino acids.

[1 mark]

Question 5

Water (H_2O) is a polar molecule, whereas methane (CH_4) is nonpolar. Which of the properties of methane is explained by methane's lack of polarity?

- A** Low molecular weight.
- B** Low boiling point.
- C** Flammability.
- D** Greenhouse gas effect.

[1 mark]

Question 6

Which of the following observations is **not** explained by water's high latent heat of vaporisation and specific heat capacity?

- A** Ice is less dense than liquid water, so it floats on water.
- B** Water exists in all three physical states (solid, liquid and gas) on Earth.
- C** A small volume of water can dissipate a lot of heat from an organism.
- D** A lot of heat energy is required to raise the temperature of water.

[1 mark]

Question 7

Which row of the table best describes the events of polypeptide synthesis?

	Type of reaction		ATP requirement	Location in cell
A	anabolic	condensation	ATP not required	mitochondria
B	anabolic	hydrolysis	ATP not required	cytoplasm
C	anabolic	condensation	ATP required	cytoplasm
D	catabolic	condensation	ATP required	mitochondria

[1 mark]

Question 8

Which row of the table lists the four common metabolites in **decreasing** order of solubility in water?

- A** oxygen → sodium chloride → cholesterol → hydrophobic amino acid
- B** sodium chloride → oxygen → hydrophobic amino acid → cholesterol
- C** hydrophobic amino acid → oxygen → sodium chloride → cholesterol
- D** sodium chloride → hydrophobic amino acid → oxygen → cholesterol

[1 mark]

Question 9

Which of the following properties of water are a result of intermolecular forces?

- I.** High surface tension.
- II.** Good solvent.
- III.** Cohesiveness.
- IV.** High specific heat capacity.

- A** I and II
- B** I, II and III
- C** I, II and IV
- D** All

[1 mark]

Question 10

Which of the following properties of water stops enzymes from being denatured during transpiration?

- I. Water retains a lot of heat.
- II. Water forms hydrogen bonds with other polar and nonpolar molecules.
- III. A lot of heat is required to evaporate water.
- IV. Water is cohesive.

- A I only
- B I and II
- C II, III and IV
- D III only

[1 mark]