Instructions: Answer all questions. Use clear, concise scientific language. Answers are provided at the end of the test questions.

Q1. Which monomer is used to build both starch and cellulose? (1 mark)

A) Amino acid B) Glucose C) Fatty acid D) Nucleotide

Q2. Define condensation polymerisation in this context of forming starch/cellulose from glucose. (1 mark)

Q3. Fill in the gaps: Carbohydrates such as starch and cellulose contain the elements _____, _____, and _____. (1 mark)

Q4. When two glucose molecules join to start a polymer chain, which small molecule is released? (1 mark)

Q5. What is the main role of starch in plants? (1 mark)

A) Main structural material in cell walls B) Energy storage

C) Enzyme function D) Oxygen transport

Q6. What is the main role of cellulose in plants? (1 mark)

A) Energy storage B) Structural support in cell walls

C) Genetic information D) Respiration

Q7. Explain briefly why starch is a compact energy store. (2 marks)

Q8. Explain why cellulose provides high strength in plant cell walls. (3 marks)

Q9. Write the chemical formula of glucose.

Q10. Fill in the blanks below with either starch or cellulose:

- Coiled/helix and compact for storage — _____
- Straight chains forming strong fibres — _____

Q11. Describe how starch is formed from glucose and how it can be broken down again. (3 marks)

Q12. How many water molecules are released when 10 glucose molecules join to form a single unbranched chain? Show reasoning. (2 marks)

Answers

Q1. Which monomer is used to build both starch and cellulose? (1 mark)

A) Amino acid B) Glucose C) Fatty acid D) Nucleotide

Answer: B) Glucose

Q2. Define condensation polymerisation in this context of forming starch/cellulose from glucose. (1 mark)

Answer: A reaction where small molecules (glucose) join together to form a polymer and a small molecule (water) is released each time a bond forms.

Q3. Fill in the gaps: Carbohydrates such as starch and cellulose contain the elements _____, _____, and _____. (1 mark)

Answer: Carbon, hydrogen and oxygen.

Q4. When two glucose molecules join to start a polymer chain, which small molecule is released? (1 mark)

Answer: Water (H_2O).

Q5. What is the main role of starch in plants? (1 mark)

A) Main structural material in cell walls B) Energy storage

C) Enzyme function D) Oxygen transport

Answer: B) Energy storage.

Q6. What is the main role of cellulose in plants? (1 mark)

A) Energy storage B) Structural support in cell walls

C) Genetic information D) Respiration

Answer: B) Structural support in cell walls.

Q7. Explain briefly why starch is a compact energy store. (2 marks)

Answer: Its chains coil (helix), so lots of glucose units (chemical energy) can be stored in a small, compact structure. (2 marks)

Q8. Explain why cellulose provides high strength in plant cell walls. (3 marks)

Answer: Cellulose has long, straight chains that pack side-by-side. Many intermolecular attractions between chains form strong fibres, giving high tensile strength.

Q9. Write the chemical formula of glucose.

Answer: $C_6H_{12}O_6$ (also expressible as C6H12O6).

1.

Q10. Fill in the blanks below with either starch or cellulose:

• Coiled/helix and compact for storage — _____

• Straight chains forming strong fibres — _____

Answer: Starch; Cellulose. (2 marks)

Q11. Describe how starch is formed from glucose and how it can be broken down again. (3 marks)

Answer: Formation: many glucose molecules join by condensation reactions, releasing water, to form starch (a polymer). Breakdown: hydrolysis (reaction with water) splits the links to reform glucose.

Q12. How many water molecules are released when 10 glucose molecules join to form a single unbranched chain? Show reasoning. (2 marks)

Answer: 9 water molecules (for n glucose units, there are n−1 links; each link releases one H_2O).