

# 1.4 Carbohydrates

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Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

**Total: 11 marks**

**KEY WORDS** cellulose 纤维素 • polysaccharides 多糖 • monosaccharides 单糖 • carbohydrates 碳水化合物  
• monomers 单体

## Objective

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Build the skills to answer exam questions on **carbohydrates**.

**You must be able to:**

- identify **monosaccharides** 单糖, disaccharides, and **polysaccharides** 多糖
- state the functions (energy storage and structure)
- link structure to function (starch, glycogen, cellulose)

## 1 Worked examples

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Study these first. Each one shows the method for a question type used later — follow the steps and you can do the Practice and Exam-style questions yourself.

### ■ The sugar building blocks

**Carbohydrates** are made of sugar monomers (**monosaccharides**, such as glucose). Two joined make a disaccharide; many joined make a **polysaccharide**.

### ■ Storage polysaccharides

**Starch** (plants) and **glycogen** (animals) store glucose for energy. Their branched/coiled shapes pack many glucose units for quick release.

### ■ Structural polysaccharides

**Cellulose** (plant cell walls) is made of glucose linked in a way that forms strong, straight fibers — providing support, not easily digested.

### ■ Structure sets function

The **same** glucose monomer builds both starch (storage) and cellulose (structure); the **difference is the type of bond**, which changes the shape and therefore the role.

## 2 Practice

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Now apply the methods above.

**2.1** Name the monomer of carbohydrates. [1]

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**2.2** State one storage polysaccharide and one structural polysaccharide. [2]

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**2.3** Which polysaccharide makes up plant cell walls? [1]

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## 3 Exam-style questions

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**3.1** The monomer that makes up starch, glycogen, and cellulose is [1]

- **A** glucose
  - **B** an amino acid
  - **C** a nucleotide
  - **D** glycerol
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**3.2** Starch and cellulose are both polymers of glucose but have different functions.

(a) State the function of each. [2]

(b) Explain how they can differ if they share the same monomer. [2]

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**3.3** Explain why glycogen's branched structure suits its role in animals. [2]

## Solutions

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**2.1** Monosaccharide (e.g. glucose).

**2.2** Storage: starch or glycogen; structural: cellulose.

**2.3** Cellulose.

**3.1 A** — glucose.

**3.2** (a) Starch stores energy (in plants); cellulose provides structure/support (cell walls).

(b) The glucose units are joined by **different bonds**, giving different shapes and therefore different functions.

**3.3** Its many branches provide many ends where glucose can be quickly added or removed, allowing fast energy storage and release to meet an animal's needs.