

Solutions

Each answer shows the steps, then the **result**.

2.1

(a)

- glycosidic bond

(b)

- ester bond

2.2

- Any two: compact / insoluble (does not leave the cell or affect water potential) / branched so many ends for fast hydrolysis / large molecule

2.3

- β -glucose means every other glucose is flipped, so chains are long and straight; many straight chains lie side by side, held by hydrogen bonds into strong microfibrils

3.1 B

- They differ only in the position of the -OH on carbon 1

3.2 C

- Three ester bonds form, so three water molecules are released

3.3 C

- Cellulose is made of β -glucose and forms straight chains

3.4

(a)

- a glycosidic bond forms by condensation, removing one water molecule

(b)

- glycogen is highly branched, giving many ends for fast hydrolysis to release glucose for respiration; cellulose is straight β -glucose chains held side by side by hydrogen bonds into strong fibres that support the cell wall

3.5

- insoluble / does not affect water potential; releases about twice the energy per gram of carbohydrate