

### 8.3 Photosynthesis

#### Question 1 (1 point)

What occurs during the light-independent reactions of photosynthesis?

- a ATP is produced.
- b Glycerate 3-phosphate is oxidized.
- c Reduction of NADP.
- d Ribulose biphosphate reacts with carbon dioxide to form a 6 carbon compound.

#### Question 2 (1 point)

What happens in the light-dependent reactions of photosynthesis?

- a Photolysis of carbon dioxide.
- b Electrons are pumped into the thylakoid space.
- c Hydrogen gas is produced as a byproduct.
- d A proton gradient is generated in the thylakoid space.

#### Question 3 (1 point)

Where are carbohydrates made in the chloroplast?

- a In the intermembrane space.
- b In the stroma.
- c On the inner membrane.
- d In the thylakoid space.

#### Question 4 (1 point)

Where do the enzymatic reactions of the Calvin cycle take place?

- a Stroma of the chloroplast
- b Thylakoid membranes
- c Matrix of the mitochondria
- d Cytosol around the chloroplast

#### Question 5 (1 point)

The pH of the thylakoid space has been measured, as have the pH of the stroma and the cytoplasm of a particular plant cell. Which, if any, relationship would you expect to find?

- a The pH within the thylakoid is lower than that of the stroma.
- b The pH of the stroma is higher than that of the cytoplasm.
- c The pH of the stroma is higher than that of the thylakoid space, but lower than that of the cytoplasm.
- d The pH of the thylakoid space is higher than anywhere else in the cell.

**Question 6** (1 point)

A flask containing photosynthetic green algae and a control flask containing water with no algae are both placed under a bank of lights, which are set to cycle between 12 hours of light and 12 hours of dark. The dissolved oxygen concentrations in both flasks are monitored. Predict what the relative dissolved oxygen concentrations will be in the flask with algae compared to the control flask.

- a The dissolved oxygen in the flask with algae will always be higher.
- b The dissolved oxygen in the flask with algae will always be lower.
- c The dissolved oxygen in the flask with algae will not be different from the control flask at any time.
- d The dissolved oxygen in the flask with algae will be higher in the light, but lower in the dark.

**Question 7** (1 point)

The NADPH required for the Calvin cycle comes from:

- a Reactions initiated in photosystem I
- b Reactions initiated in photosystem II
- c The Krebs cycle
- d Glycolysis

**Question 8** (1 point)

What is the primary function of the Calvin cycle?

- a Use ATP to release carbon dioxide
- b Use NADPH to release carbon dioxide
- c Split water and release oxygen
- d Synthesize simple sugars from carbon dioxide

**Question 9** (1 point)

What does the chemiosmotic process in chloroplasts involve?

- a Establishment of a proton gradient across the thylakoid membrane
- b Diffusion of electrons through the thylakoid membrane
- c Reduction of water to produce ATP energy
- d Movement of water by osmosis into the thylakoid space from the stroma

**Question 10** (1 point)

Which statement describes the functioning of photosystem II?

- a Light energy excites electrons in the thylakoid membrane electron transport chain.
- b Photons are passed along to a reaction centre chlorophyll.
- c Chlorophyll donates a pair of protons to  $\text{NADP}^+$ , which is converted to NADPH.

d The electrons lost from the reaction centre are replaced by electrons derived from water.

**Question 11** (1 point)

Where do the light-independent reactions take place?

- a Stroma of the chloroplast
- b Thylakoid membrane
- c Cytoplasm surrounding the chloroplast
- d Interior of the thylakoid