

Cells and Microscopy

Q1.a(2018)

C a cell wall

1. The only correct answer is C

A is not correct because both plant and animal cells have cytoplasm

B is not correct because both plant and animal cells have a cell membrane

D is not correct because both plant and animal cells have mitochondria

Q1.b(2018)

Substitution

$$20.5 \times 400 \text{ (1)}$$

Evaluation

$$8\,200 \text{ (}\mu\text{m)}$$

Q1.c(2018)

Substitution

$$(3.08 \div 400) = 0.0077 \text{ (1)}$$

Evaluation

$$7.7 \times 10^{-3}$$

Q1.d(2018)

An answer that combines **three** of the following points to provide a method:

- measure the length of the tissue (1)
- add masses / mass (1)
- remove the mass and measure length of the tissue (1)
- repeat until the tissue no longer returns to its original length (1)

Q1.e(2018)

Any one from:

- wash hands (1)
- wear gloves (1)
- sterilise the apparatus after use / disinfect working area (1)

Q2.a(2020,4)

An explanation including the following:

- lower surface (of leaf) is not in contact with air / is in water (1)
- so gas exchange cannot occur (1)

Q2.b(2020,4)

D chloroplast

The only correct answer is **D** chloroplast

A is incorrect because the nucleus does not photosynthesise

B is incorrect because the vacuole does not photosynthesise

C is incorrect because the mitochondrion does not photosynthesise

Q2.c(2020,4)

C sucrose

The only correct answer is **C** sucrose

A is incorrect because glycerol is not a sugar

B is incorrect because although ribose is a sugar this is found in DNA

D is incorrect because starch is not a sugar

Q2.d(2020,4)

A description including two from:

- in the phloem (1)
- dissolved (in water) (1)
- by translocation (1)
- using active transport (1)

Q2.e(2020,4)

An explanation including three of the following:

- because {conditions / named conditions} are suitable for {growth / photosynthesis} /conditions similar to native conditions /it is adapted to the conditions (1)
- it outcompeted the natural plants (1)
- therefore, it {grows / reproduces} (1)
- as no natural herbivores {eat it / restrict it} (1)

Q3.a(2021,4)

- a diagram of the cell that reflects its shape and some of the structures (1)
- with any **three** cell structures from {nucleus / cytoplasm / membrane / cilia} (3)

Q3.b(2021,4)

to {move/waft} {mucus / bacteria / dust}

Q3.c(2021,4)

measurement

$(2.5 - 0 =) 2.5 \text{ (cm) (1)}$

calculation

$(25 \div 10 =) 2.5 \text{ (mm per minute)}$

Q3.d(2021,4)

A description including:

- apparatus set up as the initial investigation (1)
- using {no living organisms / glass beads} instead of living organisms (1)

Q4.a(2021,4)

calculation

$(7.5 \times 400 =) 3000 \text{ (1)}$

conversion

$(3000 \div 1000 =) 3 \text{ (mm)}$

Q4.b(2021,4)

An explanation linking:

- the biconcave disc shape (1)
- results in a larger surface area (1)
- so (more) oxygen can be carried (1)

Q4.c(2021,4)

for oxygen to bind (inside the erythrocyte / red blood cell)

Q4.d(2021,4)

An explanation linking **three** from:

- water will move into the erythrocyte (1)
- by osmosis (1)
- down a concentration gradient (1)
- causing the erythrocyte to {burst/lyse} (1)

Q5.(2020,4)

Correct answer: D — chloroplast

Q6.a(2020,4)

Method:

(Add number in P + Q + R) ÷ 3

Answer:

Mean = (total ÷ 3) starch grains

(Full mark awarded for correct calculation)

Q6.b(2020,4)

Correct answer: D — cell wall, chloroplast, large vacuole

Q6.c(2020,4)

Working:

$$\text{Difference} = 50 - 30 = 20$$

$$\text{Percentage difference} = (20 \div 50) \times 100$$

Answer: 40%

Q6.d(2020,4)

Any two of:

- Temperature
- Type or size of potato
- Amount of water
- Storage conditions (other than light)

Q6.e(2020,4)

Answer:

- Glucose is needed for **respiration** to release energy.

Q6.f(2020,4)

Answer (2 marks):

- Enzymes break starch down into smaller sugars.
- This occurs through enzyme-controlled reactions producing glucose.