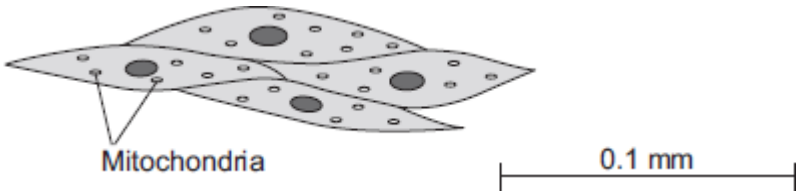
Q1. The image below shows some muscle cells from the wall of the stomach, as seen through a light microscope.



(a) Describe the function of muscle cells in the wall of the stomach.

_____

_____

_____

_____

(2)

(b) The figure above is highly magnified.

The scale bar in the figure above represents 0.1 mm.

Use a ruler to measure the length of the scale bar and then calculate the magnification of the figure above.

_____

_____

_____

_____

Magnification = _____ times

(2)

(c) The muscle cells in **Figure above** contain many mitochondria.

What is the function of mitochondria?

_____

_____

_____

(2)

(ii) Suggest why the ribosomes **cannot** be seen through a light microscope.

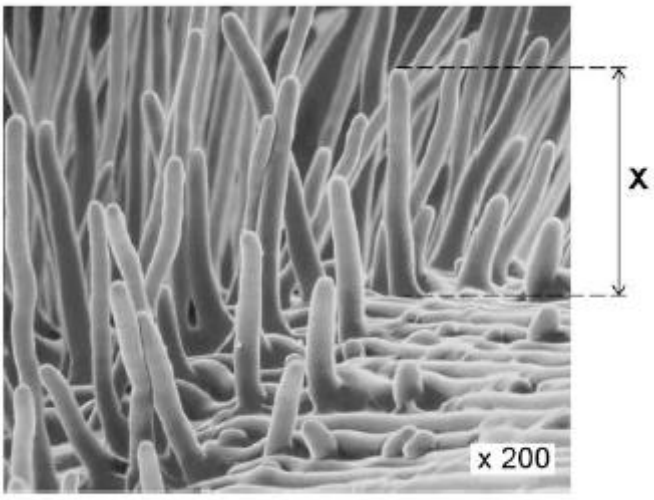
_____

_____

(1)

(Total 8 marks)

Q2. The image below shows part of a root from a cress plant.



(a) What type of microscope was used to create the image above?

_____

(1)

(b) The magnification of the cress root in the image above is × 200.
There are 1000 micrometres (μm) in a millimetre (mm).

Calculate the real length of the root hair, **X**.
Give your answer in micrometres (μm).

_____

_____

_____

_____

Real length **X** = _____ μm

(2)

Mark schemes

Q1.

(a) contract / shorten

ignore relax

*do **not** allow expand*

1

to churn / move / mix food

accept peristalsis / mechanical digestion

ignore movement unqualified

1

(b) 400

acceptable range 390-410

allow 1 mark for answer in range of 39 to 41

allow 1 mark for answer in range of 3900 to 4100

2

(c) to transfer energy for use

allow to release / give / supply / provide energy

*do **not** allow to 'make' / 'produce' / 'create' energy*

allow to make ATP

ignore to store energy

1

by (aerobic) respiration **or** from glucose

*do **not** allow anaerobic*

*energy released **for** respiration = max 1 mark*

1

(d) (i) to make protein / enzyme

ignore 'antibody' or other named protein

1

(ii) too small / very small

allow light microscope does not have sufficient magnification / resolution

allow ribosomes are smaller than mitochondria

ignore not sensitive enough

ignore ribosomes are transparent

1

[8]

Q2.

(a) electron (microscope)

1

(b) $\frac{30000}{200}$

*an answer of 150 (µm) scores **2** marks*

1

150 (µm)

*if answer is incorrect allow for **1** mark sight of 0.015 / 0.15 / 1.5 / 15*

*allow ecf for incorrect measurement of line **X** for max **1** mark*

1

(c) **either**

large surface area

allow (vacuole contains) cell sap that is more concentrated than soil water (1)

1

for more / faster osmosis

create / maintain concentration / water potential gradient (1)

or

allow thin (cell) walls

for short(er) diffusion distance

1

(d) (on hot day) more water lost

allow converse for a cold day if clearly indicated

1

more transpiration
or
more evaporation

1

so more water taken up (by roots) to replace (water) loss (from leaves)

1

(e) (aerobic) respiration occurs in mitochondria

*do **not** accept anaerobic respiration*

1

(mitochondria / respiration) release energy

*do **not** accept energy produced / made / created*

1

(energy used for) active transport

1

to transport ions, against the concentration gradient
or
from a low concentration to a high concentration

1

[12]