

COMBINED SCIENCE

0653 | Paper 6

2017 — 2023

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1 - (0653/62_Summer_2017_Q1) - B2. Cells, B10. Reproduction

Fig. 1.1 shows a flower that has been cut in half lengthways. The photograph is life-size.

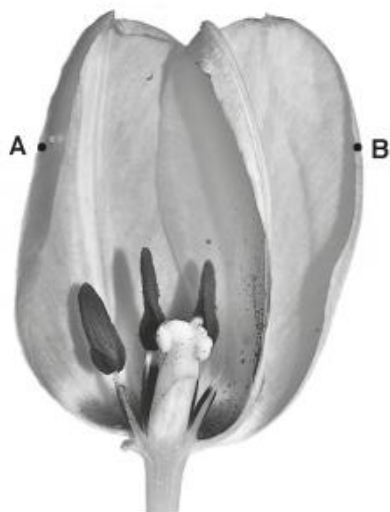


Fig. 1.1

- (a) (i) In the box shown, make a **large** pencil drawing of the flower. This should show all the flower parts including the petals.



[4]

(ii) On your drawing, use label lines to **label only** the following structures.

- an anther
- a stigma

[2]

(b) You are going to calculate the magnification of your drawing.

(i) On Fig. 1.1 draw a straight line between points **A** and **B**.

Measure the length of this line in millimetres to the nearest millimetre.

length = mm

Draw a matching line **A–B** on your pencil drawing.

Measure the length of this line in millimetres to the nearest millimetre.

length = mm

[2]

(ii) Use your two measurements to calculate the magnification of your drawing.

Show your working in the space below.

magnification = [1]

(c) On Fig. 1.1, circle the structure that receives pollen during pollination.

[1]

2 - (0653/61_Summer_2017_Q4) - B2. Cells

A nurse takes a blood sample from a patient.

(a) Describe a safety precaution the nurse should take when obtaining the blood sample from the patient.

.....
[1]

(b) Fig. 4.1 shows a photograph of some of this blood as seen under a microscope.

A white blood cell has been labelled.

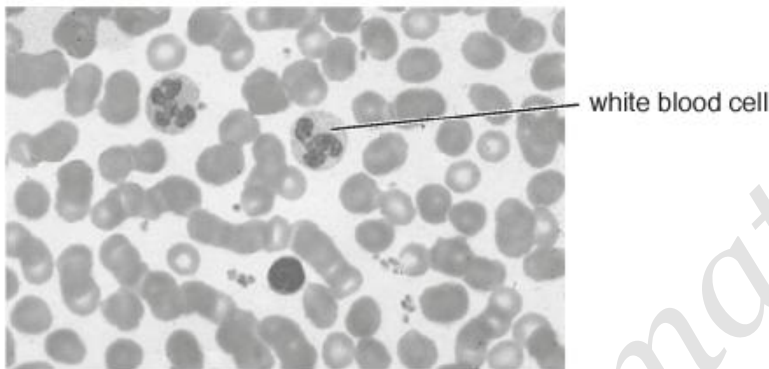


Fig. 4.1

(i) On Fig. 4.1 draw label lines and label **one** red blood cell and **one** platelet. [2]

(ii) In the box make a large pencil drawing of the labelled white blood cell.

Label the visible components.

[4]

(c) (i) Measure to the nearest 0.5 mm the diameter of the labelled white blood cell in Fig. 4.1.

diameter = mm [1]

(ii) Measure to the nearest 0.5 mm the diameter of this cell in your drawing.

diameter = mm [1]

(iii) Use these measurements to calculate the magnification of your drawing to the nearest whole number.

magnification = [1]

3 - (0653/62_Winter_2017_Q1) - B2. Cells, B10. Reproduction, B3. Biological Molecules

Fig. 1.1 shows a bean seedling from a seed that has germinated and has started to grow.



Fig. 1.1

(a) In the box provided, make an enlarged pencil drawing of the seedling.

Label the root and stem.

[3]

(b) (i) Measure the length of the bean **seed** in Fig. 1.1, excluding the root and stem.

Record this length, in millimetres, to the nearest millimetre.

length of seed in Fig. 1.1 mm [1]

(ii) Use a straight line to show this length on your drawing.

Record the length of this line, in millimetres, to the nearest millimetre.

length of seed in drawing mm [1]

(iii) Use your measurements in (i) and (ii) to calculate the magnification of your drawing.

magnification = [1]

(c) (i) A student wants to carry out an experiment on some germinated bean seeds.

Describe how the student can germinate the seeds.

.....

 [2]

(ii) The student tests the bean seeds for their nutrient content.

Her results are shown in Table 1.1.

Table 1.1

	Benedict's test	biuret test	iodine test
colour observed	clear blue	purple	blue-black

Use the information in Table 1.1 to identify the nutrients present in the bean seeds.

..... [2]

4 - (0653/61_Winter_2017_Q4) - B2. Cells

A student is studying cells using a light microscope.

She prepares cells from a plant and stains them using iodine solution.

Fig. 4.1 shows some of the cells from her microscope slide.

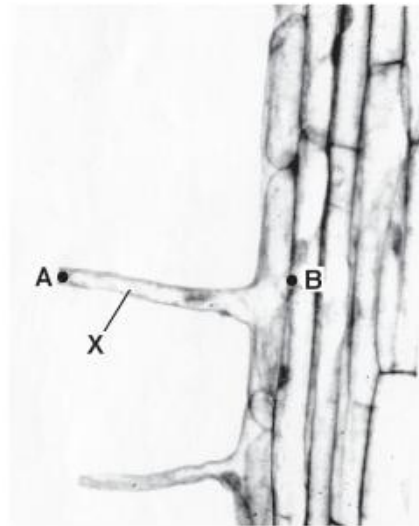


Fig. 4.1

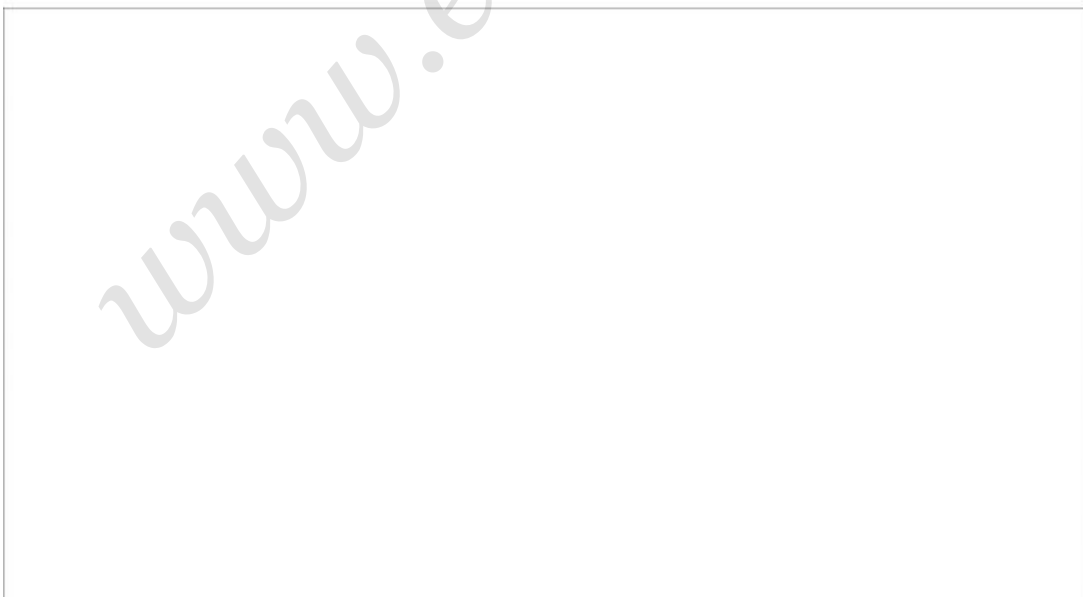
(a) Name the type of cell labelled X.

.....[1]

(b) (i) Make an enlarged pencil drawing of cell X in the box provided.

Your drawing must be larger than cell X in Fig. 4.1.

Label the nucleus and cell wall.



(ii) On cell X in Fig. 4.1, measure the length A–B in millimetres.

Record this length to the nearest millimetre.

length of cell X in Fig. 4.1 mm [1]

(iii) On your drawing, mark two points equivalent to A and B on Fig. 4.1.

Label these points C and D.

Measure the length C–D in millimetres to the nearest millimetre.

length of line on drawing mm [1]

(iv) Use your measurements in (b)(ii) and (b)(iii) to calculate the magnification of your drawing.

magnification = [1]

(c) Some parts of cell X stain blue-black after the addition of iodine solution.

Explain this observation.

.....
..... [1]

(d) The plant has a flower.

Describe the procedure you would use if you wanted to examine a sample of pollen from this flower.

.....
.....
..... [2]

5 - (0653/62_Summer_2018_Q1) - B2. Cells, B3. Biological Molecules

A student investigates bananas.

He peels a banana and cuts a slice from one end. He places the slice on a white tile with the cut surface uppermost as shown in Fig. 1.1.



Fig. 1.1

- (a) (i) In the box shown, make a detailed and enlarged pencil drawing of the cut face of the banana slice shown in Fig. 1.1.



[2]

(ii) Draw a horizontal line on the banana slice shown in Fig. 1.1 to represent the diameter.

Measure the diameter of the banana slice shown in Fig. 1.1, in millimetres, to the nearest millimetre.

diameter = mm

Draw a horizontal line on your drawing of the banana slice to represent the diameter.

Measure the diameter of your drawing of the banana slice, in millimetres, to the nearest millimetre.

diameter = mm
[2]

(iii) Use these **two** measurements to calculate the magnification of your drawing.

Show your working.

magnification =[1]

(b) The student adds some biuret solution to some mashed banana.

He observes a blue colour.

Explain his observation.

.....
.....[1]

(c) (i) Describe how you could test the banana for the presence of nutrients using Benedict's solution. Name the nutrient being tested for and the expected observation for a positive result.

method
.....
nutrient tested for
observation for a positive result
[3]

(ii) State **and** explain **one** safety precaution that is taken in this test.

.....
.....[1]

6 - (0653/61_Summer_2018_Q4) - B2. Cells

A student is studying cells.

Fig. 4.1 shows a photograph of some animal duodenum cells.

One of these cells is labelled cell A.

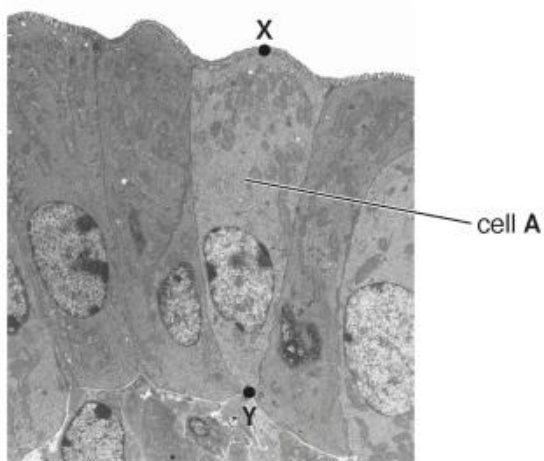
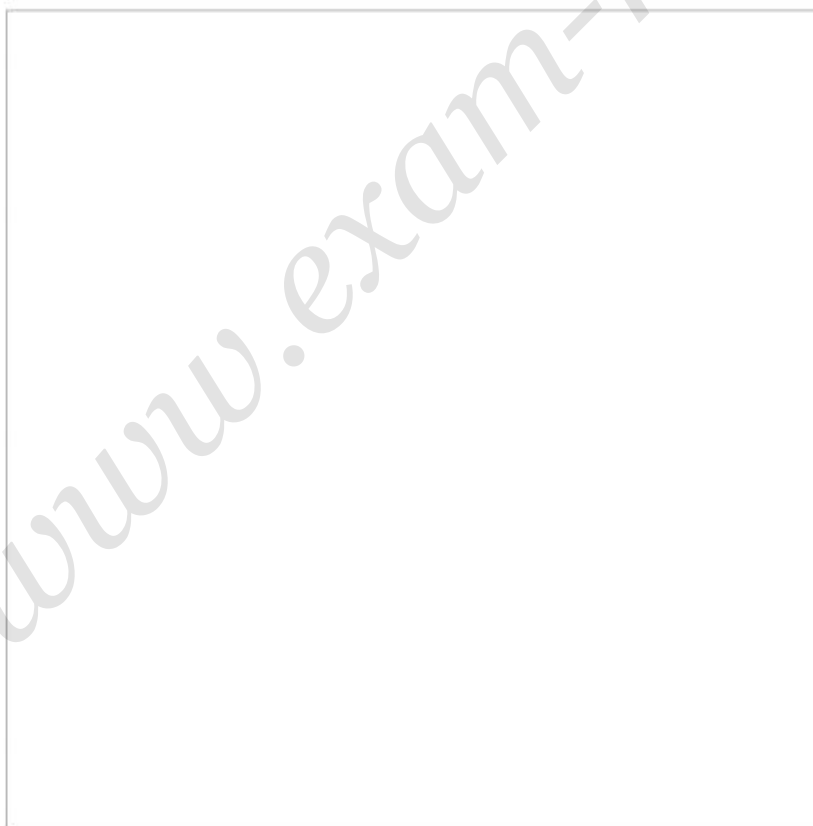


Fig. 4.1

(a) (i) In the box below, make an enlarged and detailed pencil drawing of cell A.



[3]

(ii) Draw a label line to label the nucleus of the cell in your drawing. [1]

(b) (i) Measure in millimetres, to the nearest millimetre, the length of cell **A** between points **X** and **Y** in Fig. 4.1.

length = mm [1]

(ii) Draw the line **X–Y** on your drawing in the same place as **X** and **Y** are shown in Fig. 4.1.

Measure this line, in millimetres, to the nearest millimetre.

length = mm [1]

(iii) Use your **two** measurements to calculate the magnification of your drawing.

Show your working in the space below.

magnification = [1]

(c) Describe how you could test cells in a liquid sample for the presence of fat.

reagents used and method

.....

.....

observation for a positive result

[3]

ANSWERS

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1 - (0653/62_Summer_2017_Q1) - B2. Cells, B10. Reproduction

(a)(i)	quality drawing using at least half the space and not feathery ; male parts – anther and filament ; female parts – stigma (and ovary) ; some petals ;	4
(a)(ii)	correctly labelled: anther ; stigma ;	2
(b)(i)	2 lines drawn edge to edge ; correct measurement of photograph $47 \text{ mm} \pm 1 \text{ mm}$ AND (sensible) flower measurement (larger than photograph) ;	2
(b)(ii)	correct calculation ;	1
(c)	stigma circled (on Fig.1.1) ;	1

2 - (0653/61_Summer_2017_Q4) - B2. Cells

(a)	wear gloves / safe disposal of needle / use sterilised/clean needle/equipment ;	1
(b)(i)	line to a red blood cell and labelled ; line to a platelet and labelled ;	2
(b)(ii)	quality drawing more than half of box with nucleus ; irregular cell (freehand) with nucleus – 3 lobes ; two of: nucleus labelled ; cytoplasm labelled ; (cell) membrane ;	4
(c)(i)	measurement $8(.0)/8.5/9(.0)/9.5/10(.0)\text{mm}$;	1
(c)(ii)	measurement to the nearest 0.5 mm AND larger than (c)(i) ;	1
(c)(iii)	magnification correctly calculated to the nearest whole number ;	1

3 - (0653/62_Winter_2017_Q1) - B2. Cells, B10. Reproduction, B3. Biological Molecules

(a)	quality of drawing ; larger than original ; root and stem correctly labelled ;	3
(b)(i)	14 ± 1 ;	1
(b)(ii)	correct measurement (in mm) ;	1
(b)(iii)	magnification correctly calculated and rounded correctly ;	1
(c)(i)	(placed in a suitable container with) water ; kept in a warm place ;	2
(c)(ii)	protein ; starch ;	2

4 - (0653/61_Winter_2017_Q4) - B2. Cells

(a)	Root hair ;	1
(b)(i)	Quality drawing using at least half the box ; Nucleus correctly labelled ; Cell wall correctly labelled ;	3
(b)(ii)	34 ± 1 ;	1
(b)(iii)	Measurement to nearest mm ;	1
(b)(iv)	Magnification correctly calculated ;	1
(c)	Starch present ;	1
(d)	select <u>anther</u> ; use a microscope to observe ;	2

5 - (0653/62_Summer_2018_Q1) - B2. Cells, B3. Biological Molecules

(a)(i)	quality drawing and at least half the box ; some detail in the centre ;	2
(a)(ii)	41 ± 1 ; line and measured to nearest mm ± 3 ;	2
(a)(iii)	correct calculation of magnification ;	1
(b)	no protein ;	1
(c)(i)	heat (with benedict's solution) ; reducing sugar present ; yellow / green / orange / red ;	3
(c)(ii)	goggles because of hot water / chemicals in eye ; OR use of hot water bath so hot liquid not ejected ;	1

6 - (0653/61_Summer_2018_Q4) - B2. Cells

(a)(i)	clear outline of cell (not feathery) ; approximately the correct shape and nucleus ; larger than original AND one cell ;	3
(a)(ii)	nucleus correctly labelled ;	1
(b)(i)	51 ± 2 ;	1
(b)(ii)	Drawn line and measure length ;	1
(b)(iii)	correct calculation of magnification ;	1
(c)	add alcohol ; pour into water ; white emulsion ;	3