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BIOLOGY

FOUNDATIONS IN BIOLOGY

Level & Board	OCR (A-LEVEL)
TOPIC:	CELL STRUCTURE MICROSCOPES
PAPER TYPE:	QUESTION PAPER - 2
TOTAL QUESTIONS	8
TOTAL MARKS	/31

Cell Structure – Microscopes - 2

1.

(a) Which of the following descriptions of microscopes, from A to D, is true?

(1)

A light microscope with an eyepiece lens magnification of × 10 and an objective lens magnification of × 50 will have an overall magnification of × 60. ☐

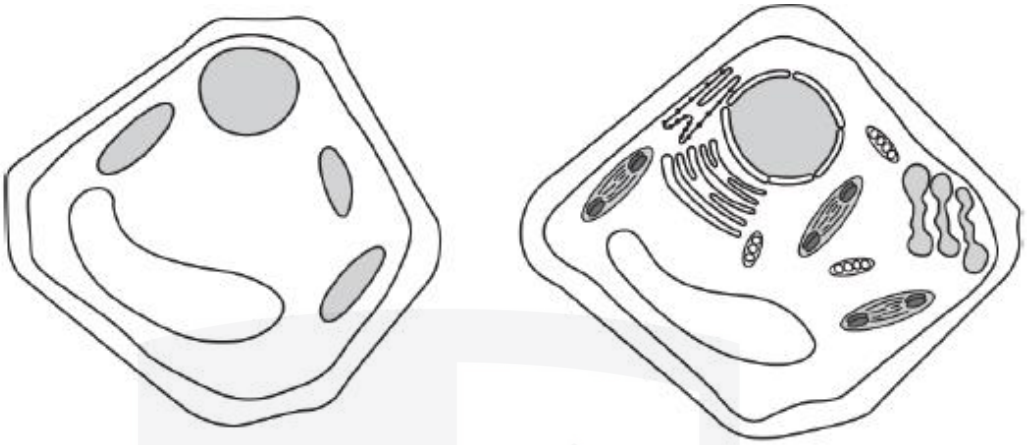
Scanning electron microscopes and laser scanning confocal microscopes can both produce three dimensional images. ☐

maximum resolution of a scanning electron microscope is lower than that of a light microscope. ☐

Transmission electron microscopes and laser scanning confocal microscopes can both produce three dimensional images. ☐

2.

A student's schematics of two plant cells are displayed in Fig. 1.1. Every cell was examined with a distinct kind of microscope. There is no scale drawing of the cells.



Cell A Cell B

Fig. 1.1

(a) An electron microscope was used to examine Cell B in Fig. 1.1.

Provide one example from Fig. 1.1 to bolster this. **(2)**

I am Sorry !!!!

(b) Describe one way that an electron microscope's image and one produced by a laser scanning confocal microscope are different. **(2)**

3.

Table 3.1 lists the maximum magnification and resolution of three different types of microscopes.

Microscope	Magnification	Resolution (nm)
X	× 1500	200
Y	× 100 000	20
Z	× 500 000	1

Table 3.1

(a) Which of the following is a transmission electron microscope: X, Y, or Z?

(2)

Below, in Figs. 3.1(a) and 3.1(b), root hairs are seen on the surface of roots. The two photos were captured using various kinds of microscopes.

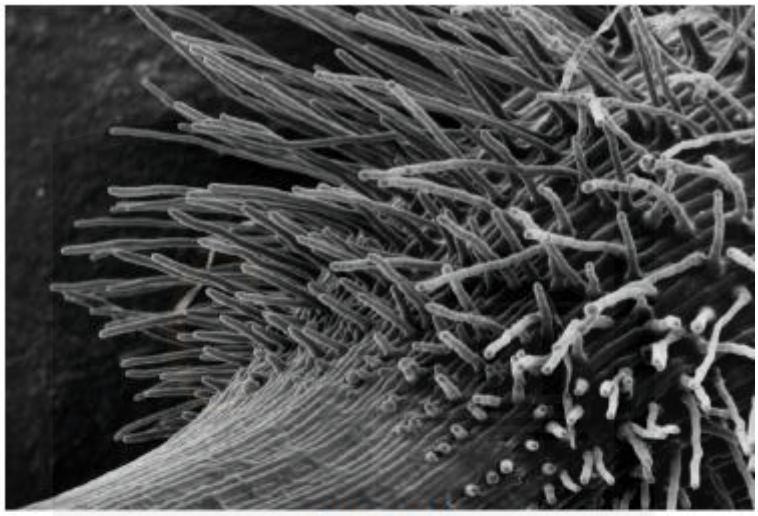


Fig. 3.1(a)

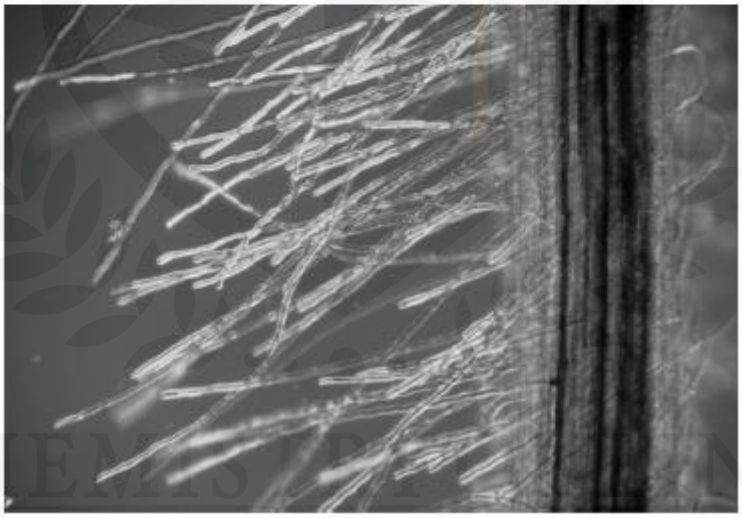


Fig. 3.1(b)

(b) A scanning electron microscope was used to capture one of the pictures. Which of the two figures in 3.1(a) and 3.1(b) was captured with a scanning electron microscope? **(2)**

4.

A typical pondweed's stem transverse section seen with a × 10 objective lens is shown in Fig. 22.1.

Underneath the stem is part of a graticule. There is a 0.1 mm gap between each marking on the graticule.

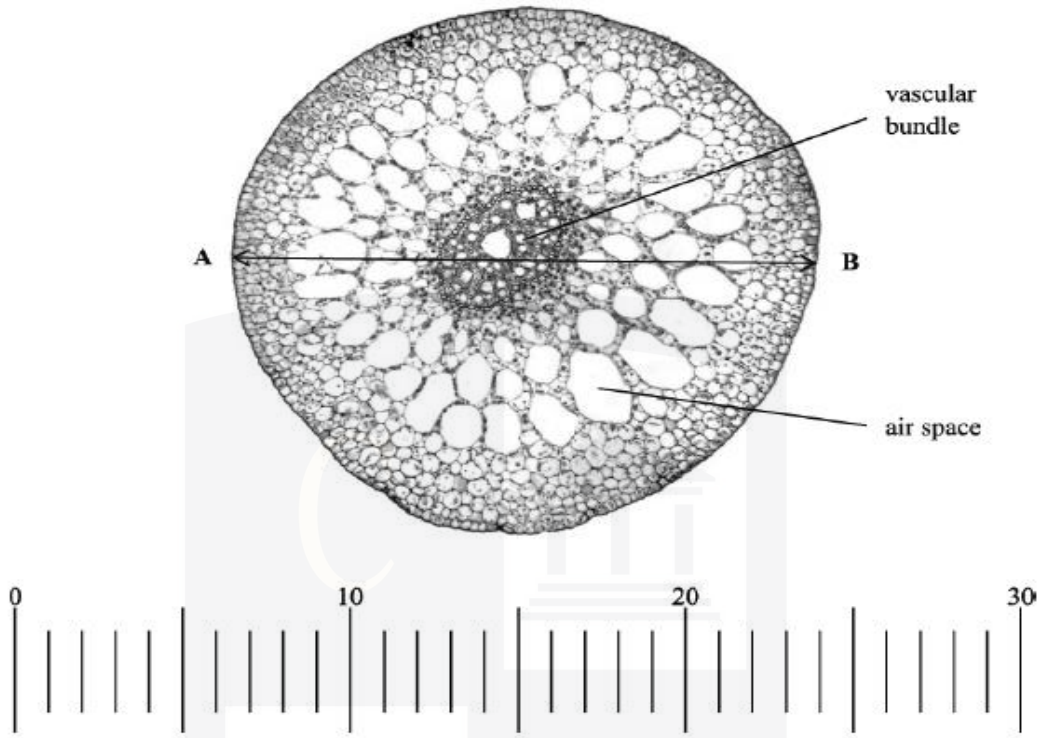


Fig. 22.1

(a) Calculate the stem's width from points A to B.

Round your response to the closest 0.1 mm. **(2)**

(b) Determine the image's magnification in Fig. 22.1. **(2)**

(c) The leaf is not given much support by its thin stem or thin cell walls. Make a suggestion for the leaf's support. **(2)**

I am Sorry !!!!!

5.

These are the three types of microscopes.

(a) Choose the row where each type of microscope is used correctly. **(1)**

	Type of microscope and what it is used to observe		
	Light microscope	**Transmission electron microscope**	**Laser scanning confocal microscope**
A	an object at a certain depth within a cell	cell surfaces	organelles
B	an object at a certain depth within a cell	cell surfaces	whole cells and tissues
C	whole cells and tissues	organelles	cell surfaces
D	whole cells and tissues	organelles	an object at a certain depth within a cell

6.

Under a light microscope, a student examined a plate containing onion root tip cells to determine which cells were in which stage of mitosis. A diagram depicting what they saw is presented in Fig. 21.

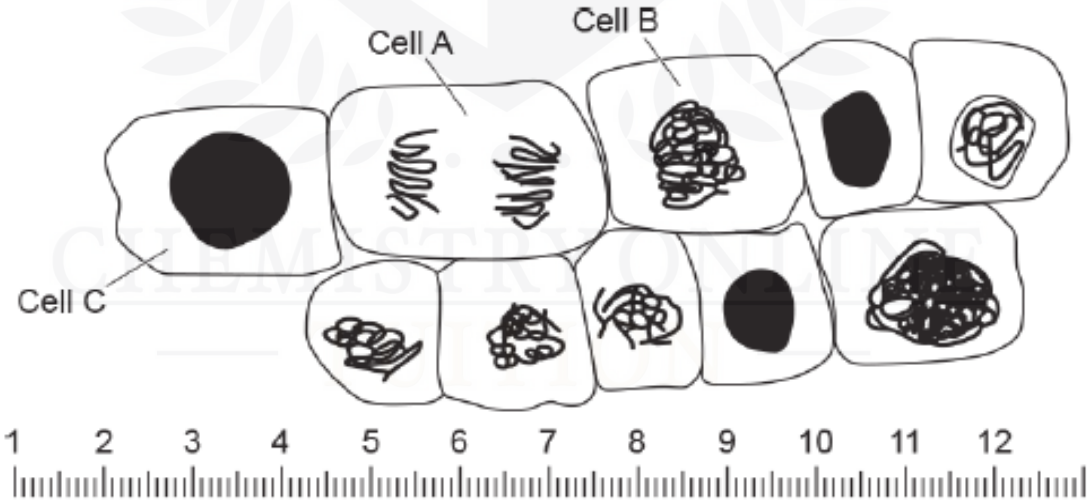


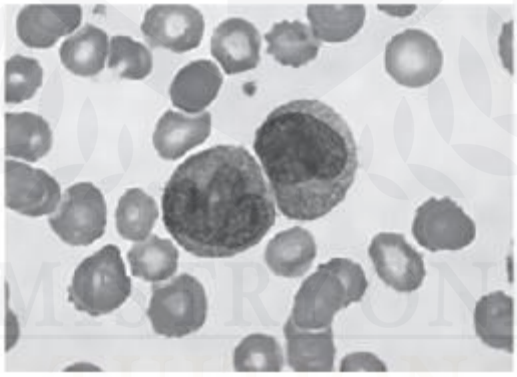
Fig. 21

(a) The eyepiece graticule that the student used is depicted in Fig. 21. The student performed the root tip squash after calibrating the graticule. He noticed that the graticule had 2.35 divisions per 20 μm.

Determine the nucleus's diameter in cell C in Figure 21. **(2)**

7.

Two white blood cells in a blood sample are seen in the picture below, which was taken under a light microscope.



(a) Describe the process of measuring the diameter of a white blood cell's nucleus when seeing the cells under a light microscope. **(4)**

I am Sorry !!!!!

8.

Heliamphora is a genus of carnivorous plants, as illustrated in Fig. 18.1. Its leaves are designed to create bug traps filled with water. The honey attracts the insects, which subsequently fall into the traps and drown. The generated mineral ions are absorbed by the plants as they break down the insects. Because of this, Heliamphora can thrive on soils that are deficient in minerals.

Fig. 18.1

Heliamphora vascular tissue slides were made by a student for light microscope examination.

The following describes the student's methodology:

1. Select a blade.
2. Cut *Heliamphora* tissue.
3. Select best pieces.
4. Place on slide.
5. Add cover slip.

(a) Provide three enhancements for this approach. Describe how each enhancement would make the created slides more valid for each one. **(6)**

(b) Talk about the advantages of staining slides for light microscopy. **(3)**

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