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| **Total marks** | 18 |
| **Time allowed** | Approximately 25 minutes |
| **Instructions** | Answer ALL questions. Write answers in the spaces provided. |

## Question 1

*A student is investigating plant cell structure using a light microscope.*

A student wants to observe onion epidermal cells using a light microscope. Describe how the student should prepare a slide of onion epidermis cells. Your answer should include the reagent used.

[4 marks]

## Question 2

The student draws a cell from a slide. The image of the cell is 54 mm long. The actual length of the cell is 0.03 mm. Calculate the magnification of the image. Show your working.

[3 marks]

## Question 3

The student switches from the x10 objective lens to the x40 objective lens. The cells appear blurry at x40. Explain why this happens and what the student should do to make the image clear.

[3 marks]

## Question 4

State TWO differences between the light microscope and the electron microscope.

[2 marks]

## Question 5

A student measures a cell on a diagram as 27 mm wide. The magnification is x900. Calculate the actual width of the cell. Give your answer in micrometres (µm). Show your working.

[3 marks]

★ **Higher Tier**

## Question 6

Explain why scientists use electron microscopes rather than light microscopes to study the internal structure of mitochondria.

[3 marks]

**END OF QUESTIONS — Total: 18 marks**