



QUESTION WORKBOOK

Microscopy: magnification, resolution and what you can trust

Cells, microscopy and biological organisation · Unit B01

AQA 3.2.1.1 · OCR A 2.1.1 (a)–(c) · Edexcel A Topic 3.1 · CAIE 1.1

6 questions · 20 marks

PRINT EDITION

SECTION A · Short, 1 to 2 marks

- A1** State what is meant by the magnification of an image, and state what is meant by the resolution of a microscope. [2]

SECTION B · Standard, 3 to 5 marks

- B1** An eyepiece graticule is calibrated against a stage micrometer whose divisions are each 10 μm long. 25 eyepiece divisions are found to cover 4 stage micrometer divisions. A cell then measures 15 eyepiece divisions across. Calculate the diameter of that cell in micrometres. [4]

- B2** Explain why a transmission electron microscope resolves finer detail than a light microscope, and explain why it cannot be used to look at a living cell. [4]

- B3** Compare a transmission electron microscope with a scanning electron microscope, referring to the specimen used, the electrons detected, the image produced and the resolution achieved. [4]

- B4** A ribosome measures 5 mm across on an electron micrograph labelled as being at a magnification of 200 000 times. Calculate the actual diameter of the ribosome, giving your answer in nanometres. [3]

- B5** A student examining an electron micrograph counts what appear to be forty separate mitochondria, of widely differing sizes and shapes, in one small cell. Suggest two reasons why this count and these shapes may be misleading. [3]
