sciencegcse.co.uk

B1 L3

B1 L3 Using a microscope: Exam questions worksheet

Mark scheme · Total 20 marks

/ means alternative answers. ( ) words in brackets are not needed for the mark. **allow** = accept this answer. **ignore** = this does not lose or gain a mark. **do not accept** = this answer cannot score the mark. If a tick-box question has more than one box ticked, give 0 marks.

Question	Answers	Extra information	Mark	AO / Spec. ref.
01.1	label 1: **objective lens** (1) label 2: **stage** (1) label 3: **fine focusing knob** (1)	1 mark for each correct label. If more than one word from the box is written on one line, do not give that mark.	3	AO1 4.1.1.2 RP 1
01.2	15 × 10 (1) = (×) **150** (1)	Correct answer with no working = 2 marks. **allow** 150 without the × sign. **do not accept** 25 (the magnifications added): 0 marks. **ignore** a unit.	2	AO2 4.1.1.5 (maths)
		Question 01 total	**5**	
02.1	**P, R, S, Q**	All four in the correct order = 2 marks. At least two letters in the correct place = 1 mark.	2	AO1 4.1.1.2 RP 1
02.2	wear **eye protection** / safety glasses / goggles	**allow** wear gloves (it stains skin). **allow** wash splashes off (the skin) with (plenty of) water. **ignore** “be careful”. **ignore** lab coat.	1	AO1 4.1.1.2 RP 1
		Question 02 total	**3**	
03.1	any **two** from: **do not shade** (the nucleus or the cytoplasm) (1) use **clear, single** (unbroken) **lines** (1) draw label lines with a **ruler** (1) label lines should **not cross** (1) add a **title** (1) add the **magnification** / a scale bar (1)	1 mark for each different way, max 2. **ignore** “remove the cell wall label” (tested in 03.2). **ignore** “draw it bigger”.	2	AO3 4.1.1.2 RP 1
03.2	cheek cells are **animal cells**, which do **not have a cell wall** / the outline is the **cell membrane**	**allow** “animal cells have no cell wall”. **allow** “only plant (and algal) cells have a cell wall”. **do not accept** “you cannot see the cell wall” on its own.	1	AO2 4.1.1.2 RP 1, 4.1.1.1
		Question 03 total	**3**	
04.1	**Ribosome**	If more than one box is ticked, give 0 marks.	1	AO2 4.1.1.5

Question	Answers	Extra information	Mark	AO / Spec. ref.
04.2	(electron microscopes have a much) **higher resolution** / resolving power (1) so (smaller) **sub-cellular structures can be seen** / cells can be studied in (much) **finer detail** (1)	**allow** "higher magnification and resolution" for the first mark; "higher magnification" alone does not score the first mark. **allow** a named example for the second mark, such as ribosomes / the inside of a mitochondrion. **allow** use of data, such as 0.2 nm compared with 200 nm, for the first mark.	2	AO2 4.1.1.5
		Question 04 total	**3**	
05	Level of response: see the level descriptors and indicative content below.		6	AO1 4.1.1.2 RP 1, 4.1.1.5
		Question 05 total	**6**	
		TOTAL	**20**	

05 Level descriptors

Level	Marks	Descriptor
3	**5–6**	A detailed, logical description of how to focus at low power then at high power, in a sensible order (lowest-power objective first; coarse focusing knob, then fine; fine knob only at high power) and of a good drawing, including at least two drawing rules and the magnification or a scale bar.
2	**3–4**	A description with some detail of focusing and of drawing. The order may not be fully clear, or the drawing is described with only one rule.
1	**1–2**	Simple statements, for example "focus it" or "draw the cells", with little detail.
0	**0**	No relevant content.

05 Indicative content

- clip the slide onto the stage, with the specimen over the hole; switch on the lamp
- start with the lowest-power objective lens
- watch from the side and turn the coarse focusing knob to bring the lens close to the slide (without touching it)
- look through the eyepiece lens and turn the coarse focusing knob to move the lens and the slide apart until the cells appear
- turn the fine focusing knob until the image is sharp
- turn the nosepiece to a higher-power objective lens
- refocus with the fine focusing knob only (the coarse knob could crack the slide)
- draw with a sharp pencil, using clear, single lines and no shading
- draw label lines with a ruler; they do not cross
- label only what can be seen, such as the cell wall, the cytoplasm and the nucleus
- add a title and the magnification (eyepiece × objective, such as × 400) or a scale bar
- **do not accept** "use the coarse focusing knob at high power" (that point scores nothing; others still score)

Model answers

01.1 1 objective lens; 2 stage; 3 fine focusing knob. **01.2** 15 × 10 = 150, so × 150. **02.1** P, R, S, Q. **02.2** Wear eye protection. **03.1** Do not shade; draw the label lines with a ruler, and do not let them cross. **03.2** Cheek cells are animal cells, so they have no cell wall: the outline is the cell membrane. **04.1** Ribosome.

04.2 Electron microscopes have a much higher resolution than light microscopes (0.2 nm, not 200 nm). So biologists can see sub-cellular structures, such as ribosomes, in much finer detail.

05 (Level 3) Clip the slide onto the stage with the cells over the hole, and switch on the lamp. Start with the lowest-power objective lens. Watching from the side, turn the coarse focusing knob to bring the lens close to the slide without touching it. Then look through the eyepiece lens and turn the coarse knob to move the lens and the slide apart until the cells appear. Make the image sharp with the fine focusing knob. Turn the nosepiece to a higher-power objective lens and refocus using only the fine focusing knob. Draw the cells with a sharp pencil, using clear, single lines and no shading. Label the cell wall, the cytoplasm and the nucleus with ruled lines that do not cross. Add a title and the magnification, such as × 400.

Original mark scheme © sciencegcse.co.uk – free to use for non-commercial education. Not an AQA mark scheme.