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B1 L2

B1 L2 Bacterial cells: 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: **plasmid** (1) label 2: **single loop of DNA** (1) label 3: **cell membrane** (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. **allow** 'DNA' or 'loop of DNA' for 2 **do not accept** 'nucleus' for 2	3	AO1 4.1.1.1
01.2	**To move the bacterium**	If more than one box is ticked, give 0 marks.	1	AO1 4.1.1.2
01.3	any **one** from: **cell membrane** / **cytoplasm** / **ribosomes**	**allow** DNA **do not accept** cell wall, plasmid, flagellum or nucleus	1	AO1 4.1.1.1
		Question 01 total	**5**	
02.1	the **bacterium**, because it has **no nucleus** (1)	Both the cell and the reason are needed for the mark. The reason must be about the nucleus. **do not accept** size on its own ('it is smaller'): prokaryotic is about the nucleus, not the size	1	AO2 4.1.1.1
02.2	**200** (µm)		1	AO2 4.1.1.1 (maths)
02.3	200 ÷ 2 (1) = **100** (1)	**allow** their 02.2 answer used correctly: their 02.2 ÷ 2 Correct answer with no working = 2 marks. **ignore** units **do not accept** 198 (subtracted)	2	AO2 4.1.1.1 (maths)
		Question 02 total	**4**	
03	any **two** from: plasmids are (much) **smaller** / **small rings** (1) a cell may have **several plasmids** but only **one main loop** (1) plasmids carry only **a few (extra) genes** / the main loop carries **most of the genes** (1) **not all bacteria have plasmids**, but every bacterium has the main loop (1) plasmids carry genes such as one that helps the bacterium **survive an antibiotic** (1)	max 2 **do not accept** 'plasmids are not made of DNA' or 'plasmids are in a nucleus'	2	AO1 4.1.1.1 4.1.1.2
		Question 03 total	**2**	

Question	Answers	Extra information	Mark	AO / Spec. ref.
04	bacteria / bacterial cells **do have DNA** (1) the DNA is (the pale tangled area at) **A** / in the middle of the cell (1) the DNA is **not enclosed in a nucleus** / is free in the cytoplasm / is a single loop (1)	max 3 **allow** 'bacteria may also have DNA in plasmids' for 1 mark **do not accept** 'A is the nucleus'	3	AO2 4.1.1.1
		Question 04 total	**3**	
05	Level of response: see the level descriptors and indicative content below.		6	AO1 4.1.1.1
		Question 05 total	**6**	
		TOTAL	**20**	

05 Level descriptors

Level	Marks	Descriptor
3	**5–6**	A detailed and coherent comparison. At least two similarities and at least three differences are given, each difference saying clearly which cell has which feature (both cells named in each point), including the nucleus or the DNA.
2	**3–4**	At least one similarity and at least two differences, with some comparison, but some points describe only one cell.
1	**1–2**	Simple statements about one or both cells, such as 'bacteria have no nucleus', with little or no comparison.
0	**0**	No relevant content.

05 Indicative content

- Similarities: both have a cell membrane; both have cytoplasm; both have ribosomes; both have DNA; both have a cell wall
- the plant cell wall is made of cellulose, but the bacterial cell wall is not
- a plant cell has a nucleus, but a bacterial cell does not
- the bacterial DNA is a single loop, free in the cytoplasm; the plant cell's DNA is enclosed in a nucleus
- a plant cell is eukaryotic; a bacterial cell is prokaryotic
- a bacterial cell may have plasmids (small rings of DNA); a plant cell does not
- a plant cell has mitochondria; a bacterial cell does not
- some plant cells have chloroplasts; a bacterial cell does not
- a plant cell has a permanent vacuole; a bacterial cell does not
- some bacteria have a flagellum; a plant cell does not
- a bacterial cell is much smaller (about 1 to 5 µm, against up to about 100 µm for a plant cell)

Model answers

01.1 1 plasmid; 2 single loop of DNA; 3 cell membrane. **01.2** To move the bacterium. **01.3** Ribosomes. **02.1** The bacterium, because it has no nucleus. **02.2** 0.2 × 1000 = 200 µm. **02.3** 200 ÷ 2 = 100 times. **03** Plasmids are much smaller than the main loop. Plasmids carry only a few extra genes, but the main loop carries most of the genes.

04 Bacteria do have DNA. The pale tangled area A is the DNA. It is not enclosed in a nucleus: it is a single loop, free in the cytoplasm.

05 (Level 3) Both cells have a cell membrane, cytoplasm and ribosomes, and both have DNA. Both also have a cell wall, but the plant cell wall is made of cellulose, whereas the bacterial cell wall is not. The plant cell's DNA is enclosed in a nucleus, so it is eukaryotic, but the bacterial cell has no nucleus: its DNA is a single loop, free in the cytoplasm, so it is prokaryotic. A bacterial cell may also have plasmids, small rings of DNA, which a plant cell does not have. A plant cell has mitochondria, a permanent vacuole and, in some cells, chloroplasts, but a bacterial cell has none of these. A bacterial cell is also much smaller: about 2 µm long, compared with up to about 100 µm.

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