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B1 L5

B1 L5 Specialised 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	A **sperm cell** (1) B **root hair cell** (1) C **nerve cell** (1)	1 mark for each correct name. If more than one name is written for one cell, do not give that mark. **allow** "sperm" for A. **do not accept** "xylem cell" for B.	3	AO1 4.1.1.3
01.2	**To contract to cause movement** (1)	If more than one box is ticked, give 0 marks.	1	AO1 4.1.1.3
		Question 01 total	**4**	
02.1	**600** (µm) (1)		1	AO2 4.1.1.3 (maths)
02.2	600 ÷ 12 (1) = **50** (times) (1)	**allow** their 02.1 answer ÷ 12 correctly worked for 2 marks. **allow** 0.6 ÷ 0.012 for the first mark. Correct answer with no working = 2 marks. **ignore** units.	2	AO2 4.1.1.3 (maths)
02.3	they are **underground** / **no light** reaches them, so they **cannot photosynthesise** (1)	**allow** "they do not photosynthesise". **do not accept** "because they are white" or "because they are not green".	1	AO2 4.1.1.3
		Question 02 total	**4**	
03.1	the folds give a **large(r) surface area** (1) so **more** (digested food) molecules / glucose can be **absorbed** (more quickly) (1)	**allow** "more surface" / "bigger surface" for the first mark. **do not accept** "more space".	2	AO2 4.1.1.3
03.2	mitochondria **release energy** (by respiration) (1) (the energy is needed) for **active transport** (of glucose / food molecules into the cell) (1)	**do not accept** "mitochondria make / produce energy": that point scores 0, the second point can still score.	2	AO2 4.1.1.3
		Question 03 total	**4**	
04	**most animal cells** differentiate at an **early stage** (1) **many plant cells** keep the ability to differentiate **throughout life** (1)	**allow** "animal cells lose the ability to differentiate early" for the first mark. **allow** "in adult animals, cell division is mainly for repair and replacement" for the first mark if the plant point is also made. **do not accept** "plant cells divide and animal cells do not".	2	AO1 4.1.1.4
		Question 04 total	**2**	

Question	Answers	Extra information	Mark	AO / Spec. ref.
05	Level of response: see the level descriptors and indicative content below.	Read the whole answer, decide the level, then the mark within the level.	6	AO1, AO2 4.1.1.3
		Question 05 total	**6**	
		TOTAL	**20**	

05 Level descriptors

Level	Marks	Descriptor
3	**5–6**	A detailed and coherent explanation of both cells. At least two features of the nerve cell and two of the muscle cell are given, and each is linked to how it helps the cell do its job.
2	**3–4**	Features of both cells are given, with some linked to their jobs; or one cell is explained in detail.
1	**1–2**	Simple statements of features or jobs, such as “nerve cells are long” or “muscles contract”, with little or no explanation.
0	**0**	No relevant content.

05 Indicative content

- nerve cells carry electrical impulses (from the brain or spinal cord to the muscles)
- a nerve cell is long, so it can carry impulses a long way (for example, down the arm)
- branched endings connect with many other cells / pass impulses to many muscle cells
- a fatty sheath insulates the nerve cell, so impulses travel quickly
- muscle cells contract (get shorter) to cause movement
- muscle cells contain protein fibres that slide over each other, so the cell gets shorter
- muscle cells have many mitochondria, which release energy (by respiration) for contraction
- many muscle cells contract together (in muscular tissue), so the arm moves

allow names not needed for AQA when used correctly: “axon” for the long fibre, “myelin (sheath)” for the fatty sheath, “nerve endings” or “dendrites” for branched endings. **do not accept** “nerve cells carry blood” or “mitochondria make / produce energy” (those points score nothing).

Model answers

01.1 A sperm cell; B root hair cell; C nerve cell. **01.2** To contract to cause movement. **02.1** 0.6 × 1000 = 600 µm. **02.2** 600 ÷ 12 = 50 times. **02.3** They are underground, where there is no light, so they cannot photosynthesise.

03.1 The folds give the cell a large surface area, so it can absorb more digested food molecules. **03.2** Mitochondria release energy by respiration. The cell needs this energy for active transport of glucose into the cell.

04 Most animal cells differentiate at an early stage, but many plant cells keep the ability to differentiate throughout their lives.

05 (Level 3) Nerve cells carry electrical impulses to the muscle cells. A nerve cell is long, so it can carry impulses a long way down the arm. Its branched endings connect with many muscle cells, so one impulse can reach many of them. A fatty sheath insulates the nerve cell, so the impulses travel quickly. Muscle cells contract to move the arm. They contain protein fibres that slide over each other, so the cell gets shorter. They have many mitochondria, which release the energy needed for contraction. Many muscle cells contract together, so the arm moves.

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