1.1 Cells and Organisation: 30-minute Pack

Calculator allowed · about 30 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A blood vessel that carries blood away from the heart and usually has thick muscular walls is called an artery.

(a) True or false and give one reason. **(2)**

2 Name the process by which small molecules like glucose move from the blood into cells by passing through gaps in the cell membrane without using energy.

(a) Name the process. **(1)**

3 A student uses a microscope on high power. Suggest one risk and one precaution, and explain how the precaution reduces the risk.

(a) Give one risk and one precaution, and explain how the precaution reduces the risk. **(3)**

4 In a fair test into osmosis, list three variables that should be kept the same when comparing different sugar concentrations.

(a) List three control variables. **(3)**

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5 For each feature below, write one of these answers: animal cell, plant cell, or both.

(a) Has a cell wall. **(1)**

(b) Contains chloroplasts. **(1)**

(c) Has a nucleus. **(1)**

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6 A student measures the length of several cheek cells using a microscope scale. Their measurements in micrometres are 45, 52, 47, 50, 46.

(a) Calculate the mean cell length. **(2)**

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(b) Suggest one reason why the measurements are not exactly the same. **(2)**

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7 The table shows data from an investigation into the effect of temperature on the rate of diffusion of a dye across a membrane model.

Temperature (°C)	Time for dye to appear on the other side (s)
15	180
25	120
35	80
45	60

(a) Describe the pattern in the data: what happens to diffusion time as temperature increases? **(1)**

(b) Calculate the percentage decrease in time from 15°C to 35°C. **(3)**

8 Explain how root hair cells are adapted for absorbing water and minerals. Give two adaptations and a brief explanation for each.

(a) Adaptation 1 and explanation. **(2)**

(b) Adaptation 2 and explanation. **(2)**

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9 Which of these organelles is found in plant cells but is never found in animal cells?

- [ ] A) Nucleus
- [ ] B) Mitochondria
- [ ] C) Chloroplast
- [ ] D) Cytoplasm

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10 Practical investigation: a student places a fresh celery stick, freshly cut at the base, into a beaker of water coloured with red food dye. She leaves it for 24 hours, then cuts a thin cross-section near the base of the stalk and examines it.

(a) Predict what the student would observe in the cross-section after 24 hours. **(1)**

(b) Name the plant tissue responsible for carrying the coloured water up the celery stalk. **(1)**

(c) Explain how the structure of xylem vessels helps them transport water efficiently. **(2)**

(d) The student repeats the experiment but places a second celery stick in a beaker of the same dyed water kept in a cold refrigerator. Predict and explain how the results would differ. **(2)**

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Mark scheme · 1.1 Cells and Organisation: 30-minute Pack

Question 1

(a) true cao **B1**

(a) reason such as 'thick muscular elastic walls to cope with high pressure' **B1**

(a) Answer: **True. Arteries carry blood away from the heart and have thick muscular walls to withstand high pressure.**

Question 2

(a) diffusion (accept passive transport or facilitated diffusion) cao **B1**

(a) Answer: **Diffusion**

Question 3

(a) identifies a risk of using a microscope on high power, such as the objective lens hitting and damaging the slide **M1**

(a) states a suitable precaution addressing that risk, such as using the fine-focus knob only on high power or checking the objective lens does not touch the slide **A1**

(a) gives a correct explanation linking the stated precaution to the stated risk, e.g. careful fine focusing / keeping the lens clear of the slide prevents the objective lens hitting and damaging the slide **A1**

(a) Answer: **Risk: on high power the objective lens could hit and crack the slide. Precaution: use the fine-focus knob on high power so the lens can be moved carefully without striking the slide. This reduces the risk of damage.**

Question 4

(a) any one distinct valid control variable, e.g. temperature; volume of sugar solution; same potato / same type or batch of potato; size, mass or surface area of potato cylinders; duration in solution **B1**

(a) any second distinct valid control variable from the accepted list **B1**

(a) any third distinct valid control variable from the accepted list **B1**

(a) Answer: **Any three distinct controls, for example temperature, volume of sugar solution, and using the same type or batch of potato. Keep the sugar concentration as the independent variable being changed.**

Question 5

(a) plant cell cao **B1**

(a) Answer: **Plant cell**

(b) plant cell cao **B1**

(b) Answer: **Plant cell**

(c) both cao **B1**

(c) Answer: **Both**

Question 6

(a) method: sum 45+52+47+50+46 = 240 and divide by 5 **M1**

(a) 48 micrometres cao **A1**

(a) Answer: **48 micrometres**

(b) measurement error or natural variation or sample not identical, oe **M1**

(b) linked explanation such as differences in cell stage or human error when reading the scale **A1**

(b) Answer: **Natural variation between cells or small measurement errors when reading the microscope scale.**

Question 7

(a) time decreases as temperature increases **B1**

(a) Answer: **Diffusion time decreases as temperature increases.**

(b) change = 180 - 80 = 100 **M1**

(b) divides the change by the original time: 100 / 180 (x 100) **M1**

(b) 55.6% (accept 55.56% or 56%) cao **A1**

(b) Answer: **55.6%**

Question 8

(a) gives adaptation such as large surface area due to hair like projection **M1**

(a) explains that larger surface area increases water uptake **A1**

(a) Answer: **Root hair cells have long thin projections giving a large surface area, which increases water absorption.**

(b) gives adaptation such as thin cell wall or many mitochondria **M1**

(b) links thin wall to short diffusion distance or mitochondria to active transport of minerals **A1**

(b) Answer: **They have a thin cell wall for a short diffusion distance, and many mitochondria to provide energy for active uptake of minerals.**

Question 9

C cao **B1**

Answer: **C) Chloroplast**

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Question 10

(a) small red dots/rings (a pattern of coloured points) visible around the edge of the cross-section, oe **B1**

(a) Answer: **A ring of small red dots around the edge of the cross-section.**

(b) xylem cao **B1**

(b) Answer: **Xylem.**

(c) xylem vessels are long, hollow tubes formed from dead cells joined end to end, with no end walls or cell contents in the way **M1**

(c) this allows water to flow through them easily and continuously up the plant, oe **A1**

(c) Answer: **Xylem vessels are hollow tubes of dead, joined-up cells with no end walls or contents, allowing water to flow through them easily.**

(d) in the cold fridge, the dye would rise more slowly, or a shorter distance, in the same time **M1**

(d) because transpiration (water evaporating from the leaves, drawing water up the xylem) happens more slowly at a lower temperature, reducing the rate of water uptake, oe **A1**

(d) Answer: **The dye would rise more slowly in the fridge, because transpiration (which draws water up the xylem) happens more slowly at lower temperatures.**

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