



Quality Assessment Tasks

NAME: _____

VCE® Biology

Unit 1 Examination

Reading time: 10 minutes

Writing time: 90 minutes

QUESTION AND ANSWER BOOK

Section	Number of questions	Number of questions to be answered	Number of marks
A	25	25	25
B	8	8	50
		Total	75

This exam will be marked out of 75.

- Students are permitted to bring into the examination room: pens, pencils, highlighters, erasers, sharpeners and rulers.
- Students are NOT permitted to bring into the examination room: blank sheets of paper and/or white out liquid/tape.
- No calculator is allowed.

Materials supplied

- Question and answer book of 24 pages.
- Answer sheet for multiple-choice questions.

Instructions

- Write your **student name** in the space provided above on this page.
- Check that your **student name** is printed on your answer sheet for multiple-choice.
- All written responses must be in English.

At the end of the examination

- Place the answer sheet for multiple-choice questions inside the front cover of this book.

Your teacher will advise you of the contribution of this exam to your School-Assessed Coursework.

Students are NOT permitted to bring into the examination room mobile phones and/or any other unauthorised electronic devices.

Section A: Multiple Choice**Instructions for Section A**

Answer all questions in pencil on the answer sheet provided for multiple-choice questions.

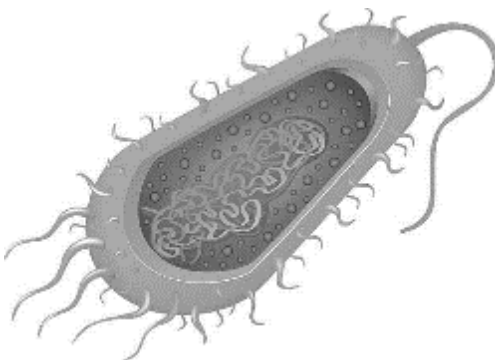
Choose the response that is correct or that best answers the question.

A correct answer scores 1; an incorrect answer scores 0.

Marks will not be deducted for incorrect answers.

No marks will be given if more than one answer is completed for any question.

Unless otherwise indicated, the diagrams in this section are not drawn to scale.

Question 1**Figure 1**

It is most likely that the cell depicted in Figure 1

- A. contains a nucleus.
- B. is contained by a cell membrane.
- C. belongs to the kingdom Protista.
- D. generates energy through photosynthesis.

Use the information below to answer Questions 2 & 3.

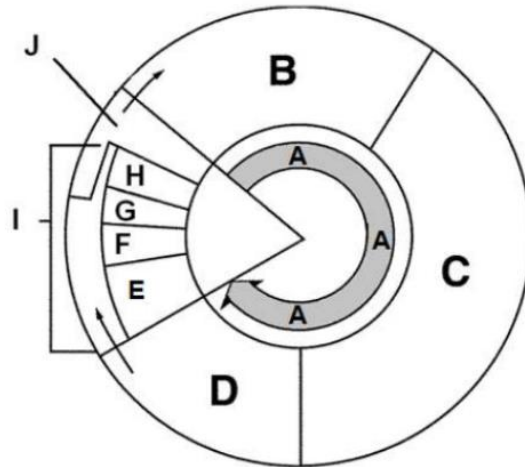


Figure 2

Question 2

In the diagram pictured in Figure 2, the label 'C' represents

- A. Prophase.
- B. Interphase.
- C. Mitosis.
- D. DNA replication.

Question 3

During the part of the cell cycle labelled 'F'

- A. sister chromatids separate and move to opposite sides of the cell.
- B. Chromatin winds up and becomes chromosomes.
- C. sister chromatids line up along the equator.
- D. two nuclear membranes are reforming.

Question 4

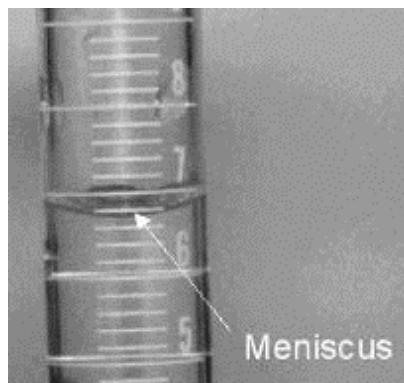


Figure 3

When reading the volume of water in a volumetric cylinder, we are reminded to read from the ‘bottom of the meniscus’. What is one reason it is important to follow this instruction when completing an experiment that requires the repeated measurement of water?

- A. It can help support the experiment’s hypothesis.
- B. It can be used to authenticate primary data.
- C. It can produce more reliable qualitative data.
- D. It can improve the precision of the experiment.

Question 5

One distinction between xylem and phloem is

	Xylem	Phloem
A.	Bidirectional	Unidirectional
B.	Conducting cells in the xylem are dead.	Conducting cells in the phloem are living.
C.	Complex tissue that helps to transport food and organic materials in a plant.	Tissue that helps to transport water and nutrients in the plant.
D.	Does not provide structural support.	Provides structural support.

Use the information below to answer Questions 6 & 7.

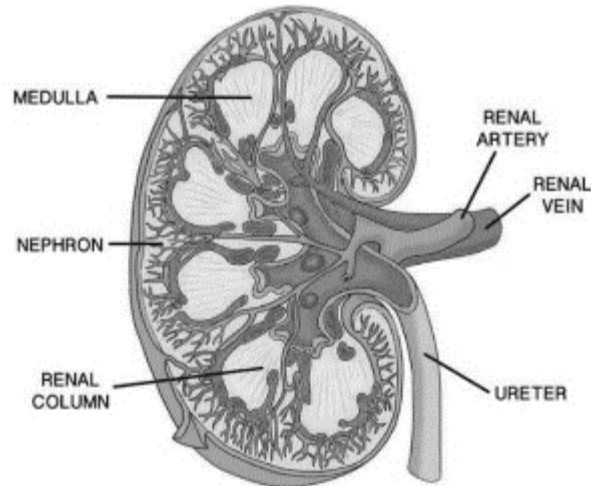


Figure 4

Question 6

The organ depicted in Figure 4

- A. plays a functional role in maintaining body temperature.
- B. secretes glucagon when blood sugar levels are low.
- C. contains structures that absorb excess glucose.
- D. cleanses the blood of toxins and excess fluid.

Question 7

The ureter connects the organ depicted in Figure 4 to the

- A. heart.
- B. bladder.
- C. pancreas.
- D. small intestine.

Question 8

The inner membrane of a mitochondrion is arranged into folds. This

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- A. increases the surface area to volume ratio of the membrane.
- B. increases the rate of diffusion across the membrane.
- C. is stacked into structures called 'grana'.
- D. is most often sausage shaped.

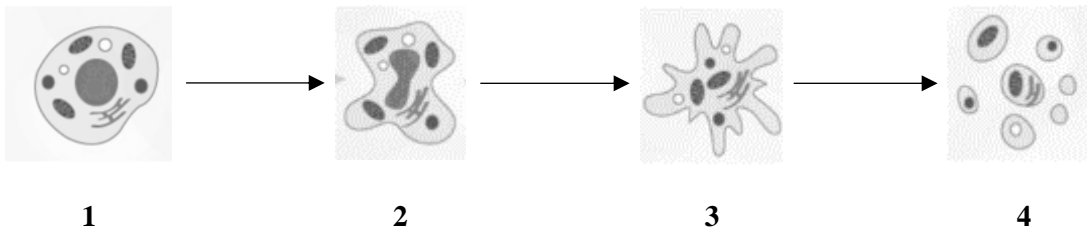
Question 9

Figure 5

Figure 5 shows four distinct phases of a cellular process. At the 3rd phase of this process

- A. the nucleus begins to break apart.
- B. small blebs form.
- C. the cell breaks into several bodies.
- D. the blebs fuse and become larger.

Question 10

In Question 9, there is reference to 'blebs'. A bleb is

- A. a fragment of a cell.
- B. a rupture in the plasma membrane.
- C. a breakdown in the cytoskeleton of a cell.
- D. an irregular bulge in the plasma membrane.

Question 11

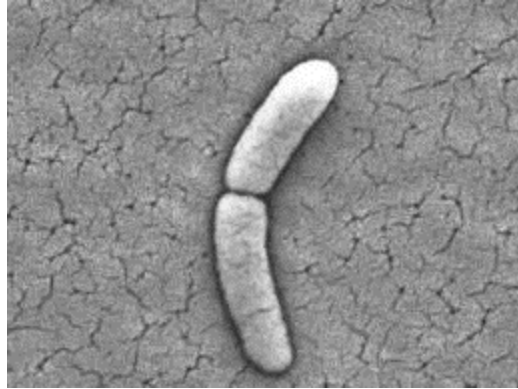
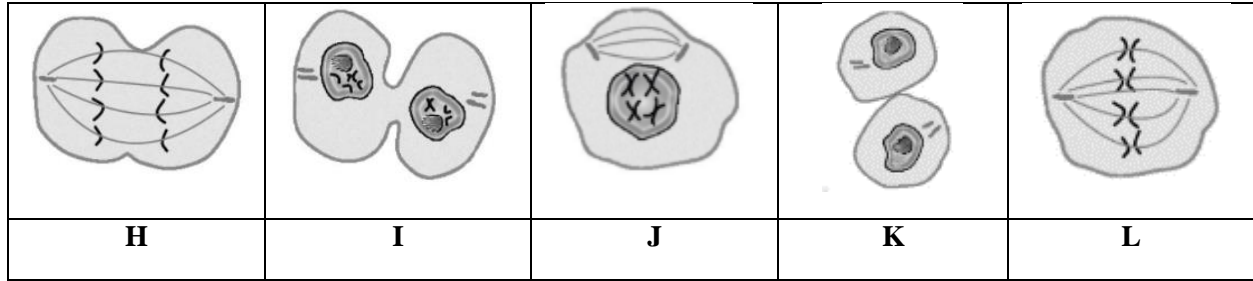


Figure 6

It is most likely that the organisms captured in the electron micrograph pictured in Figure 6

- A. is an autotroph.
- B. contains a nucleus.
- C. contains mitochondria but not chloroplasts.
- D. will produce offspring with identical genetic information.

Use the information below to answer Questions 12 – 14.

**Question 12**

The correct order for these diagrams is

- A. H, I, J, K, L
- B. J, H, L, I, K
- C. J, L, H, I, K
- D. K, L, J, I, H

Question 13

At the stage labelled 'L'

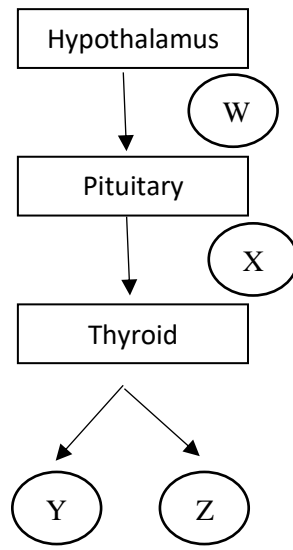
- A. two identical daughter cells are formed.
- B. Chromatin condenses to form chromosomes.
- C. the centrosomes extend microtubules towards the condensed chromosomes.
- D. the chromosomes line up through their centromeres along the line of division.

Question 14

Stage J occurs during this stage of the cell cycle

- A. G1
- B. G2
- C. M
- D. S

Use the information below to answer Questions 15 and 16.

**Question 15**

The names of the hormones represented by the letters W, X, Y and Z in the flowchart above are

- A. Thyroidstimulating hormone, thyrotropin-releasing hormone, Triiodothyronine, Thyroxine.
- B. Thyrotropin-releasing hormone, Thyroidstimulating hormone, Triiodothyronine, Thyroxine.
- C. Triiodothyronine, Thyroxine, Thyroidstimulating hormone, thyrotropin-releasing hormone.
- D. Thyroidstimulating hormone, thyrotropin-releasing hormone, Thyroxine, Triiodothyronine.

Question 16

In someone diagnosed with hyperthyroidism

- A. the thyroid gland overproduces thyroxine.
- B. the pituitary gland overproduces thyroxine.
- C. the thyroid gland overproduces thyroidstimulating hormone.
- D. the pituitary gland overproduces thyroidstimulating hormone.

Question 17

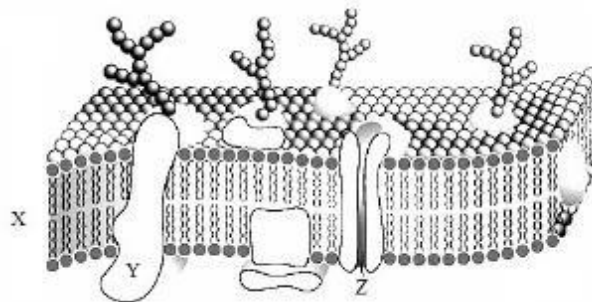


Figure 7

The structure labelled 'Z'

- A. enables the passive transport of water.
- B. facilitates the movement of ATP.
- C. requires ATP to function.
- D. is hydrophobic.

Question 18

The structure labelled 'X' is comprised mainly of

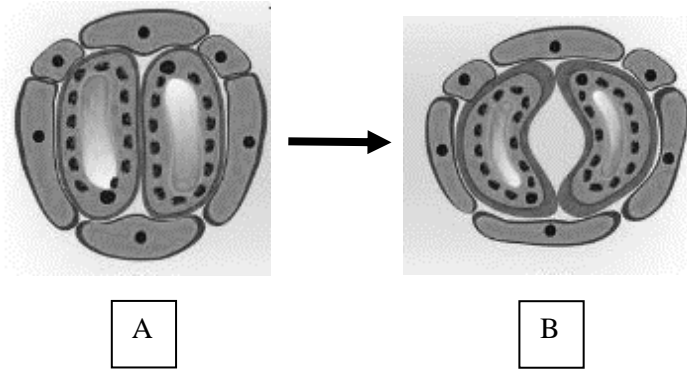
- A. lipids.
- B. carbohydrates.
- C. proteins.
- D. cytoplasm.

Question 19

One difference between the large and the small intestine is that only the small intestine

- A. is involved in the absorption of water.
- B. produces vitamins.
- C. is involved in the absorption of nutrients.
- D. is comprised of smooth muscle tissue.

Question 20



One reason that the structure labelled in A would change to look more like the structure labelled in B is

- A. it is night-time.
- B. oxygen is being absorbed.
- C. photosynthesis is occurring.
- D. the transpiration stream is broken.

Question 21

The role of insulin in the regulation of blood glucose is

- A. to absorb glucose.
- B. to stimulate the release of glucagon.
- C. to signal to fat cells.
- D. to signal excess glucose to the liver.

Question 22

	Embryonic Stem Cells	Adult Stem Cells
Potency	L	
Derivation	M	
Primary Role		N

The terms that are best represented by **L**, **M** and **N** are

	L	M	N
A.	Totipotent	Bone marrow	Maintain and repair damaged tissue.
B.	Totipotent	Blastocyst	Maintain and repair damaged tissue.
C.	Pluripotent	Blastocyst	Differentiation into any cell type.
D.	Pluripotent	Bone marrow	Differentiation into any cell type.

Use the following information to answer Questions 23 and 24.

A student designed an investigation that compared the effect of surface area to volume ratio on a series of potato cubes. Potato cubes were placed in a weak sodium chloride solution for 24 hours. Some of the results are captured in the table below. To minimise error, the same scale was used when weighing each cube of potato at the beginning and end of the experiment.

Sample No.	Size of potato cube (mm ³)	Initial weight (gms)	Final weight (gms)
1	10	5.6	6.5
2	20	7.8	9.3
3	30	11.2	13.4
4	40	14.5	10.5

Question 23

One explanation that the results shown in the 'Final Weight' column against the potato cube with an initial weight of 14.5 could be that

- A. the tape used to measure the potato cubes was stretched when measurements were taken.
- B. potato is not a good material to use to investigate surface area to volume ratio.
- C. the solutions into which the potato cubes were placed were not the same.
- D. potato cells have a semi-permeable membrane.

Question 24

The sample with the fastest diffusion rate is most likely

- A. 1
- B. 2
- C. 3
- D. 4

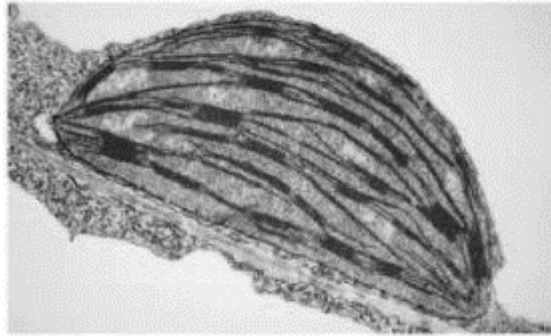
Question 25

Figure 8

The structure pictured in Figure 8 is

- A. responsible for generating ATP.
- B. found in prokaryotes and eukaryotes.
- C. bound by a double membrane.
- D. undergoing mitosis.

Section B: Short Answer Questions

Instructions for Section B

Answer all questions in space provided.
Use a blue or black pen.

Question 1 (5 marks)

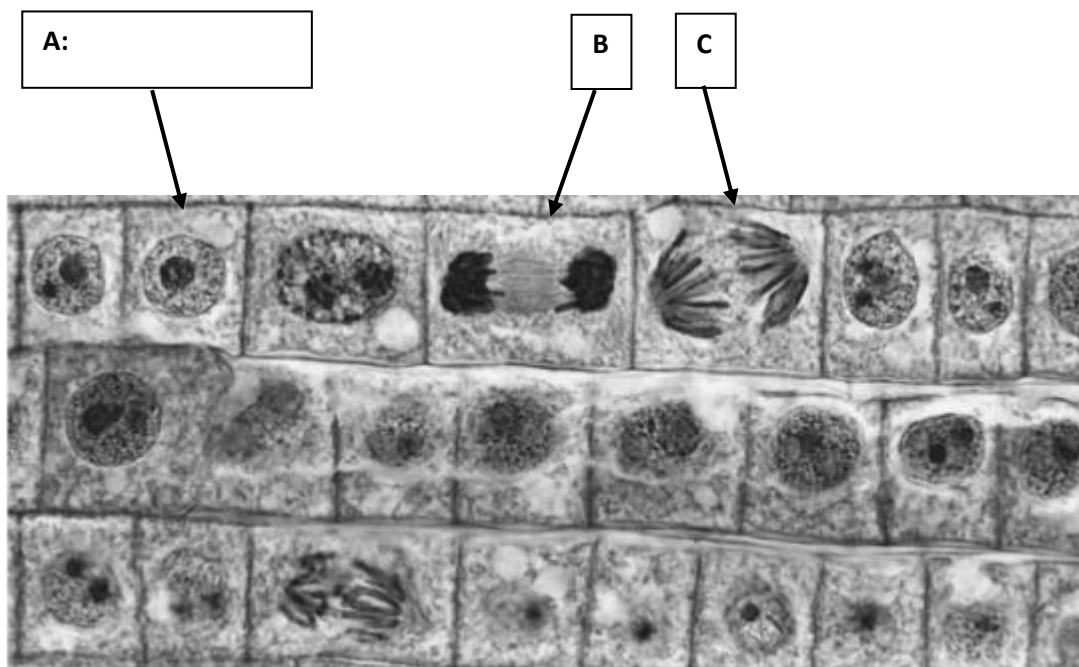


Figure 1: Onion Root cells

Figure 1 shows Onion root cells undergoing mitosis

- (a) Label the stage of mitosis shown at 'A'. (1 mark)
- (b) Outline the difference between the cell labelled 'B' and the cell labelled 'C'. (2 marks)

- (c) Explain a stage of mitosis that is not labelled in Figure 1. (2 marks)

Question 2 (5 marks)

Consider the electron micrograph below.

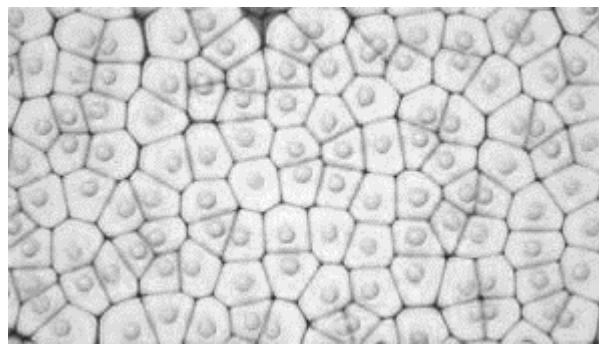


Figure 2

- (a) Suggest the type of organism this image captures. (1 mark)

- (b) Describe the way that the cells in the image above reproduce. (2 marks)

(c) Outline two ways in which a prokaryote will differ from a eukaryote. (2 marks)

Question 3 (8 marks)

A young man was concerned by a lump that had formed in his armpit. After visiting his doctor, a sample of the lump was sent to a laboratory for analysis. Part of the report returned from the lab is shown below.

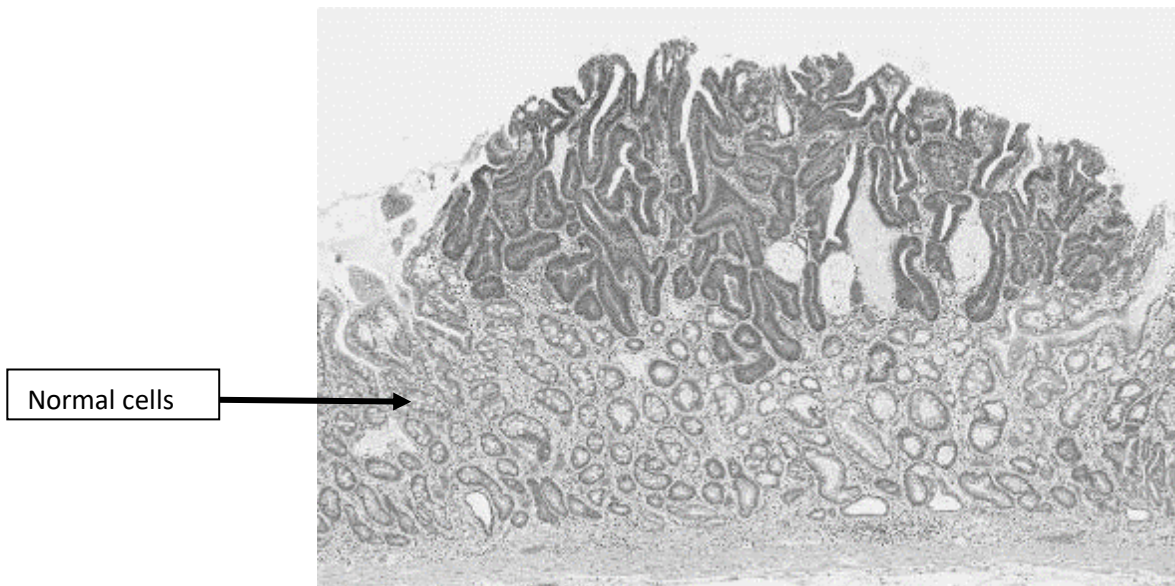


Figure 3

(a) What might be one diagnosis that has returned from the lab? (1 mark)

(b) Justify the answer you provided in part (a) with reference to the information provided. (2 marks)

(c) Outline the process of apoptosis. (3 marks)

(d) Describe the role of apoptosis in the development of the disorder outlined in part (a). (2 marks)

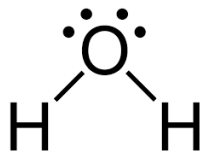
Question 4 (8 marks)

Figure 4: Scientific model

Figure 4 shows a scientific model for a water molecule.

- (a) What is meant by the term ‘scientific model’? (1 mark)

- (b) Explain the purpose of a scientific model. (1 mark)

- (c) Explain how a scientific theory differs from a scientific model. (2 marks)

- (d) Use a scientific model to represent the feedback loop associated with the maintenance of blood glucose. (3 marks)

- (e) Describe one symptom of a malfunction of the feedback loop represented in part (d). (1 mark)

Question 5 (4 marks)

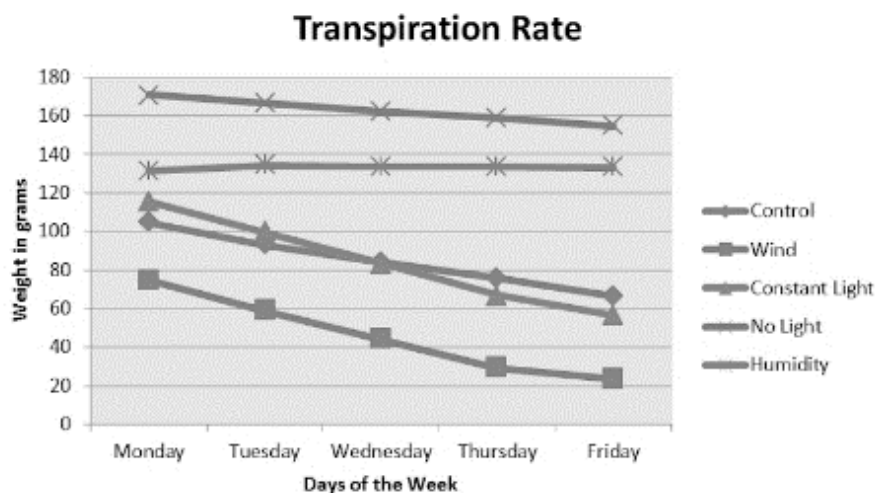
- (a) Draw a labelled diagram of a chloroplast. (3 marks)

- (b) Explain the purpose of chlorophyll. (1 mark)

Question 6 (9 marks)

Students set up an experiment to test the effects of different environmental factors on the rate of plant transpiration. They recorded their results each day, beginning on Monday. Below is an excerpt of the results they obtained.

Environ. Factor	Monday (initial)	Tuesday	Wednesday	Thursday	Friday
Control	104.6g	Mass (g): 93.1 Change in mass: -11%	Mass (g): 84.2 Change in mass: -20%	Mass (g): 75.7 Change in mass: -28%	Mass (g): 66.8 Change in mass: -36.1%
Wind	74.8g	Mass: 58.9 Change in mass: -21%	Mass: 44.1 Change in mass: -41%	Mass: 29.3 Change in mass: -61%	Mass: 23.9 Change in mass: -69%
Constant Light	115.4g	Mass: 99.7 Change in mass: -13.6%	Mass: 83.5 Change in mass: -27.6%	Mass: 66.9 Change in mass: -42%	Mass: 56.9 Change in mass: -51%
No Light	170.8g	Mass: 166.7 Change in mass: -2.4%	Mass: 162.4 Change in mass: -4.9%	Mass: 158.9 Change in mass: -6.9%	Not Recorded
Humidity	131.4g	Mass: 134.3 Change in mass: 2.2%	Mass: 133.7 Change in mass: -1.8%	Mass: 133.8 Change in mass: -1.8%	Mass: 133.1 Change in mass: -1.3



(a) Write a possible hypothesis for this experiment.

(2 marks)

(b) Distinguish between a method and a methodology. (2 marks)

(c) Outline three things that can be understood following this investigation about the effect of various environmental factors on the rate of transpiration. (3 marks)

(d) What is meant by the term ‘transpiration’? (1 mark)

(e) Outline one potential source of random error that the students may encounter when conducting this investigation. (1 mark)

Question 7 (7 marks)

The graph below shows the number of mitochondria per cell of different cell types.

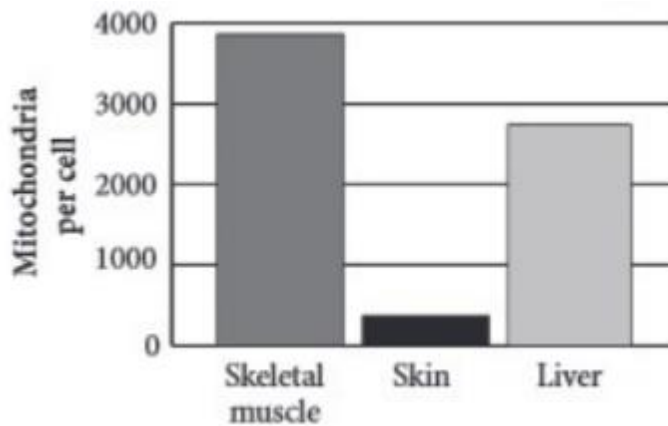


Figure 5: Number of Mitochondria in Different Cell Types

- (a) Outline one reason that the number of mitochondria per skeletal muscle cell is almost eight times the number found in skin cells. (2 marks)

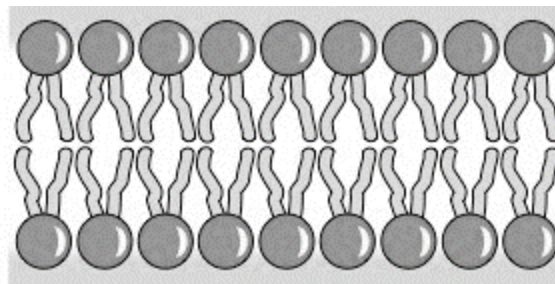
Looking at this graph, one student was prompted to claim that ‘the skin has fewer mitochondria per cell as some skin cells do not need mitochondria’.

- (b) Explain how you would respond to this student. (2 marks)

- (c) Name one function that a skin cell conducts that is enabled by the presence of mitochondria. (1 mark)

- (d) The liver is classed as part of the digestive system. Explain what is meant by a system in this context. (2 marks)

Question 8 (4 marks)



- (a) What structure is represented by the image above? (1 mark)

- (b) Explain what causes the components of the structure to arrange in this pattern. (2 marks)

- (c) Label the diagram to show how this structure interacts with surrounding fluid. (1 mark)

END OF WRITTEN EXAMINATION

Instructions: Circle the letter corresponding to the correct response for each question.

- | | | | | |
|-----|---|---|---|---|
| 1. | A | B | C | D |
| 2. | A | B | C | D |
| 3. | A | B | C | D |
| 4. | A | B | C | D |
| 5. | A | B | C | D |
| 6. | A | B | C | D |
| 7. | A | B | C | D |
| 8. | A | B | C | D |
| 9. | A | B | C | D |
| 10. | A | B | C | D |
| 11. | A | B | C | D |
| 12. | A | B | C | D |
| 13. | A | B | C | D |
| 14. | A | B | C | D |
| 15. | A | B | C | D |
| 16. | A | B | C | D |
| 17. | A | B | C | D |
| 18. | A | B | C | D |
| 19. | A | B | C | D |
| 20. | A | B | C | D |
| 21. | A | B | C | D |
| 22. | A | B | C | D |
| 23. | A | B | C | D |
| 24. | A | B | C | D |
| 25. | A | B | C | D |