



Hillcrest High School

Grade 10

Life Sciences JUNE 2024

MARKS: 150

TIME: 2 ½ Hours

EXAMINER: Miss Blom

MODERATORS: Mrs Harmse & Mrs Prior

Instructions:

1. Answers ALL questions in the answer booklet provided.
2. Number your answers exactly as the questions are numbered.
3. Present your answers according to the instructions of each question.
4. Write neatly and legibly in blue or black ink.
5. Do ALL drawings in pencil and label in pen.
6. You may use a non-programmable calculator.

SECTION A**Question 1**

1.1 Various options are provided as possible answers to the following questions. Choose the answer and write only the letter (A to D) next to the question number (1.1.1 to 1.1.10) in the ANSWER BOOK, for example 1.1.11 D.

1.1.1. What is the function of the cuticle on the surface of a leaf?

- a) To absorb water
- b) To protect against predators
- c) To prevent water loss
- d) To aid in gas exchange

1.1.2. The foramen magnum is found in the...

- a) Lower limb
- b) Skull
- c) Spinal column
- d) Upper limb

1.1.3. Which ONE of the following elements is only present in proteins?

- a) Hydrogen
- b) Nitrogen
- c) Carbon
- d) Oxygen

1.1.4. Material used to store genetic information in a cell is...

- a) Ribosomes
- b) Endoplasmic reticulum
- c) Centrioles
- d) Deoxyribonucleic acid

1.1.5. What tissue do osteocytes form part of?

- a) Blood
- b) Epidermis
- c) Bone
- d) Collenchyma

1.1.6. The vascular bundles in dicotyledonous plants are made up of...

- a) Xylem, phloem, cambium, and sclerenchyma.
- b) Xylem and phloem only.
- c) Xylem, phloem and epidermis.
- d) Phloem and sclerenchyma only.

1.1.7. The structure that prevents oxygenated and deoxygenated blood from mixing in the heart.

- a) Septum
- b) Cardiac muscle
- c) Capillary
- d) Heart wall

1.1.8. Chromosomes make copies of themselves before mitosis so that after division:

- a) Two chromosomes in the new cells are the same size.
- b) Two new cells have the same number of chromosomes.
- c) Two chromosomes can form pairs.
- d) All of the above.

1.1.9. Epithelium tissue lining the mouth and lungs is known as...tissue.

- a) Cuboidal
- b) Columnar
- c) Ciliated columnar
- d) Squamous

1.1.10. The tissue between the upper and lower epidermis in leaves is known as:

- a) Cuticle
- b) Mesophyll
- c) Stomata
- d) Axillary

(10x2) **(20)**

1.2 Give the correct biological term for each of the following descriptions. Write **ONLY** the term next to the question number (1.2.1 to 1.2.8) in your ANSWER BOOK.

1.2.1. A plant tissue that contains chlorophyll

1.2.2. The growth or tumour that forms as a result of uncontrolled mitosis.

1.2.3. The membrane around a vacuole.

1.2.4. The monomers of proteins.

1.2.5. Bones that protect the spinal cord.

1.2.6. Animal tissues that transmit impulses.

1.2.7. Osmotic pressure by which water rises into the stems of plants from the roots.

1.2.8. The outer edge of a leaf blade.

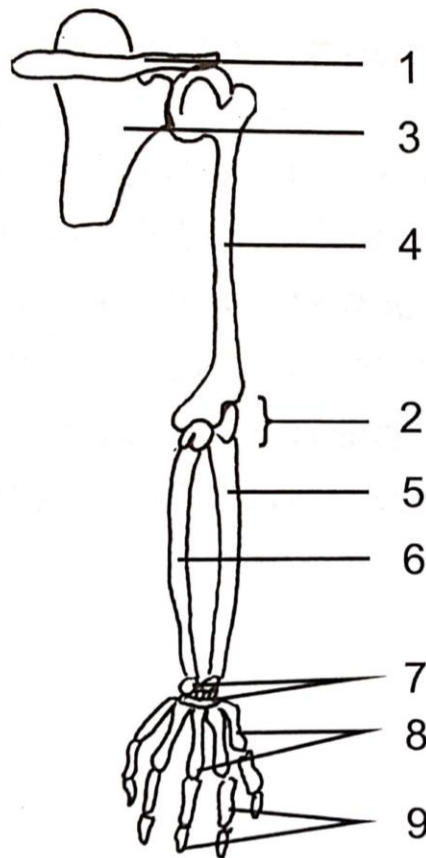
(8x1) (8)

1.3 Indicate whether each of the statements in COLUMN I applies to **A ONLY**, **B ONLY**, **BOTH A AND B** or **NONE** of the items in COLUMN II. Write **A only**, **B only**, **both A and B** or **none**, next to the question number (1.3.1 to 1.3.4) in the ANSWER BOOK.

Column A	Column B
1.3.1. A skeleton type often made of chitin	A. Exoskeleton B. Endoskeleton
1.3.2. Animal tissue that carries oxygen	A. Blood B. Cartilage
1.3.3. A type of carbohydrate	A. Glucose B. Starch
1.3.4. Substance that a plant cell wall is made of.	A. Protein B. Glycerol

(4x2) (8)

1.4. Study the diagram below and answer the following questions.



1.4.1. Provide labels for the parts numbered **1**, **3** and **4**. (3)

1.4.2. a) Name the type of joint located at part numbered **2**. (1)

b) Name the type of joint located at part **7**. (1)

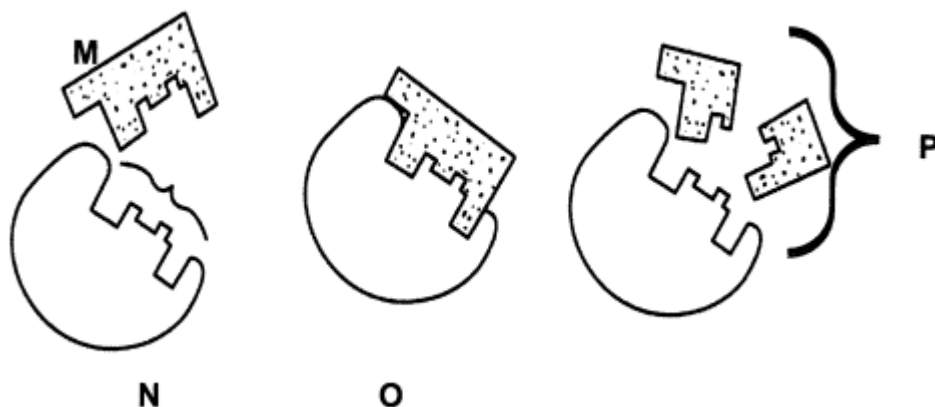
1.4.3. Name the connective tissue that joins part **4** and **5**. (1)

1.4.4. a) Name the connective tissue found at the ends of part numbered **4**. (1)

b) Write down ONE function of this tissue named in Q1.4.4 a). (1)

(8)

1.5. The diagram below represents a property of enzymes.



1.5.1. Give labels for:

- (a) **M** (1)
 (b) **O** (1)
 (c) **P** (1)

1.5.3. Provide **TWO** factors that can result in organic molecule **N** becoming denatured. (2)

1.5.3. The diagram represents a specific theory about enzyme activity. Name this theory. (1)

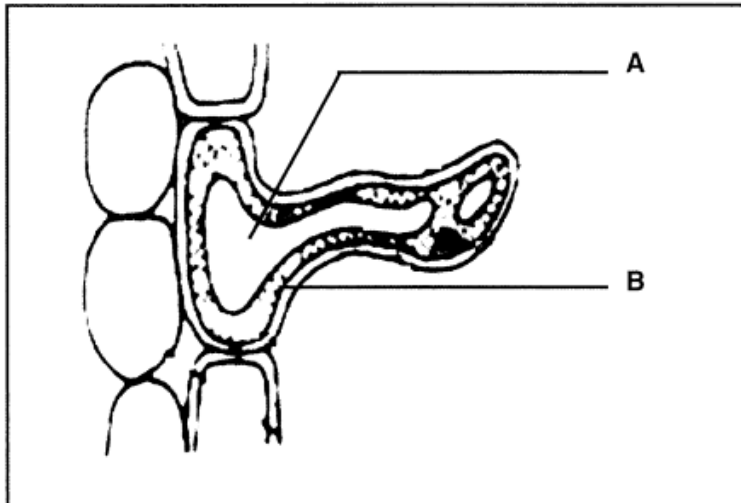
(6)

[SECTION A = 50 MARKS]

SECTION B

Question Two

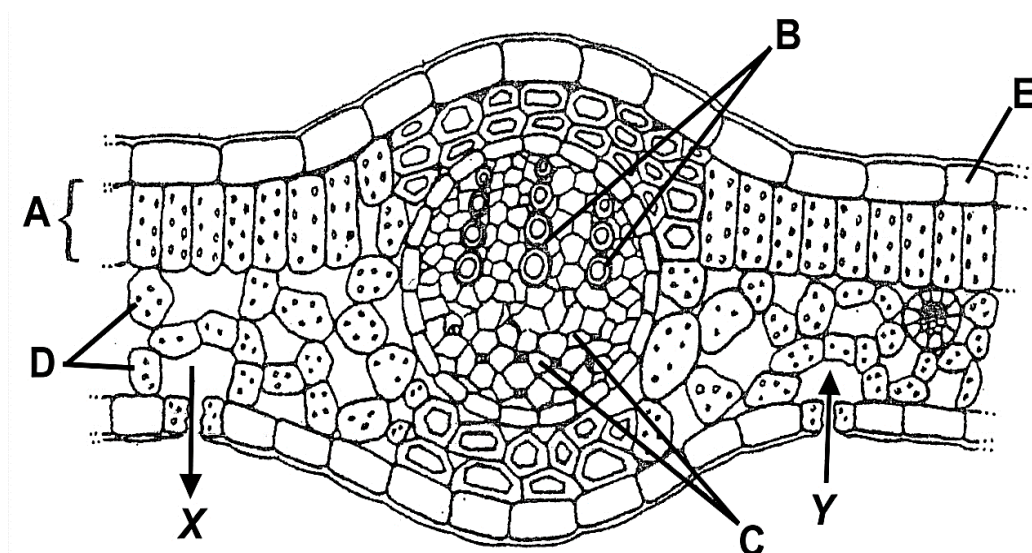
2.1. The diagram below represents a cell found in a plant root.



- 2.1.1. Identify the specialised structure in the diagram above (1)
- 2.1.2. In which plant tissue is this cell found? (1)
- 2.1.3. Name the parts labelled **A** and **B**. (2)
- 2.1.4. Describe two ways the structure in 2.1.1. is adapted for its function. (4)

(8)

2.2. Study the diagram of a leaf below and answer the questions that follow.



- 2.2.1. Name the parts labelled **A**, **C** and **E**. (3)

2.2.2. Identify gases **X** and **Y**. (2)

2.2.3.a) Name the process that occurs in the cells labelled **A**. (1)

b) Explain how the cells in **A** are adapted to carry out the process in 2.2.3(a). (3)

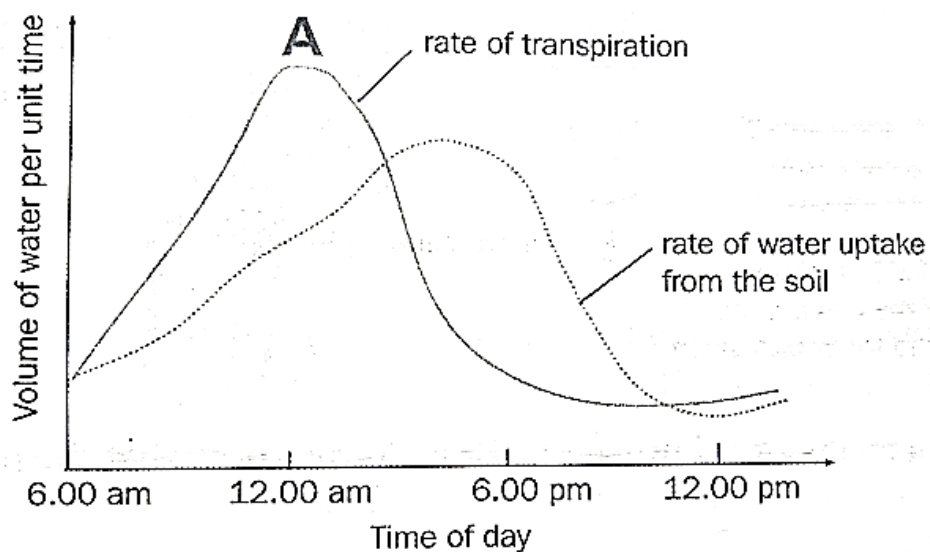
2.2.4. a) Name the opening through which gases enter and leave the leaf surface. (1)

b) Name the cells that control that opening. (1)

2.2.5. Define transpiration and describe **TWO** factors that can affect transpiration rate. (5)

(16)

2.3. The graph below shows how the rate of water uptake from the soil and the rate of transpiration of a sunflower plant changes at different times of the day.



2.3.1. At what time of day was the rate of transpiration the highest? (1)

2.3.2. Give a reason for your answer in Question 2.3.1. as to why the rate of transpiration is highest at this time. (2)

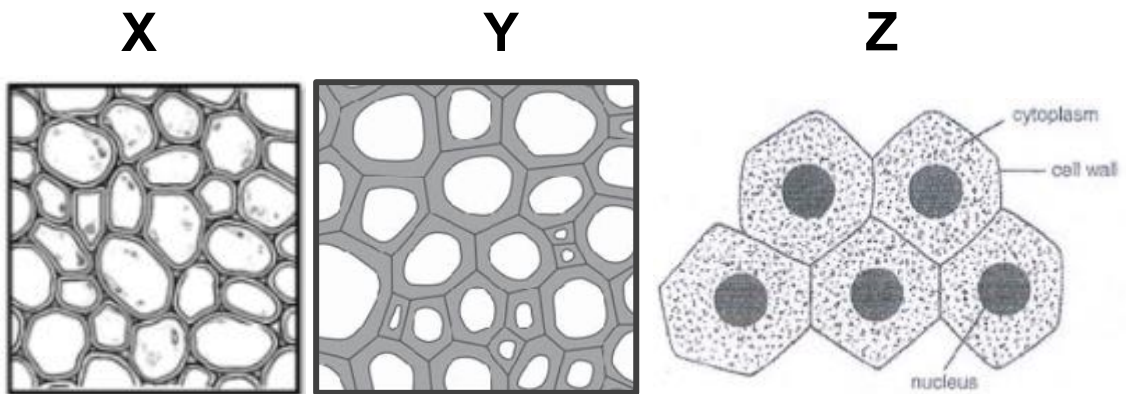
2.3.3. What happens to the rate of transpiration after point **A**? Suggest a possible reason for this. (2)

2.3.4 Name the apparatus that is used to determine the rate of transpiration. (1)

2.3.5. Identify the dependent variable. (1)

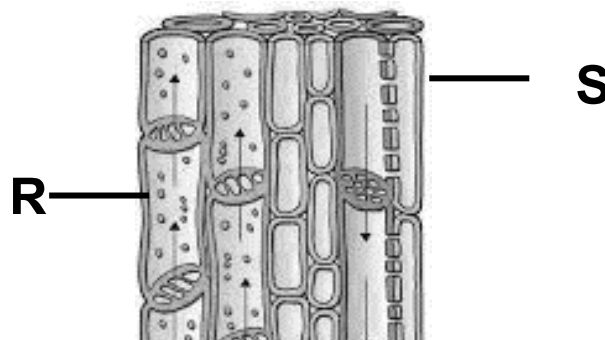
(7)

2.4 The diagrams below represent different plant tissues.



- 2.4.1. Provide the LETTER and NAME of the tissue that plays a role in storage. (2)
- 2.4.2. Provide the LETTER and NAME of the tissue that would be present in root and shoot tips. (2)
- 2.4.3. Which tissue X or Y is specialised for providing strength to the plant? (1)
- 2.4.4. Provide **ONE** visible reason for your answer in 2.4.3. (1)

2.4.5. Refer to the figure below representing vascular tissues.



- 2.4.6 a) Name TWO substances transported by tissue R. (2)
 - b) Explain why substances transported by tissue S move in a different direction to those transported by tissue R. (3)
- (11)**

2.5. A study was carried out to find out the relationship between the age of a person and the gradual loss of calcium from the bones (osteoporosis) which causes them to break easily. The study was done using a group of men from the ages of 30 to 80 years old. There were 20 men studied in **each** age group.

The incidence of osteoporosis for each age group is recorded in the table below.

Table showing the Incidence of Osteoporosis in men from ages 30 to 80 years.

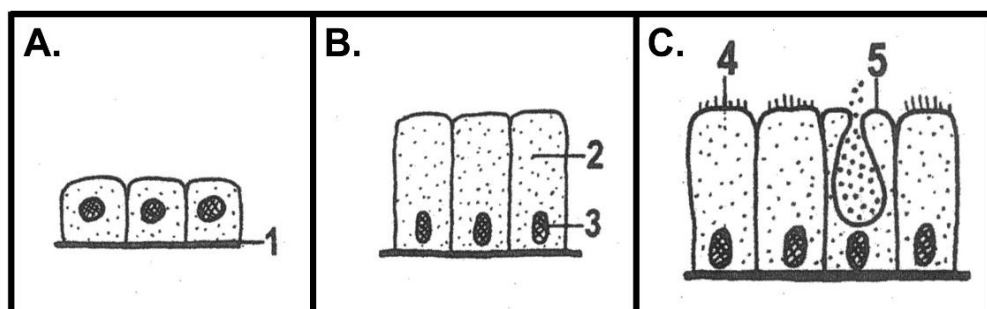
Age of the men (years)	Incidence of Osteoporosis (%)
30	15
40	18
50	27
60	40
70	60
80	90

- 2.5.1. Draw a LINE GRAPH using the data in the table above. (5)
- 2.5.2. Calculate the number of 50-year-old men with osteoporosis. (2)
- 2.5.3. Name one other body part that is made stronger by calcium. (1)
- (8)

QUESTION 2: 50 MARKS

Question Three

- 3.1. Study the diagrams below of different types of epithelial tissues and answer the questions that follow.

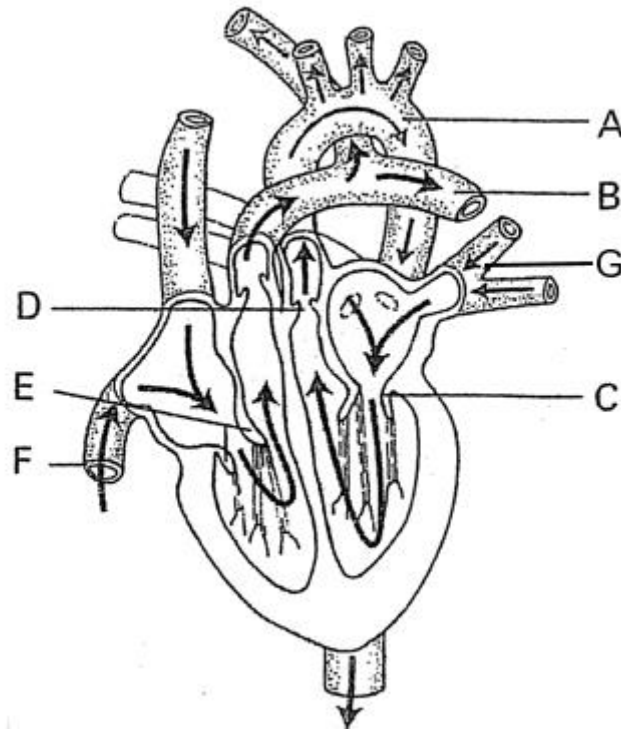


- 3.1.1. Identify tissues **A** and **B**. (2)
- 3.1.2. Refer to diagram **C**:
- Name **ONE** area in the body where this tissue would be found. (1)
 - Give the name of the cell labelled **5**. (1)

c) What is the function of cell 5? (1)

(5)

3.2. The diagram below shows the internal structure of a human heart. Study the diagram and answer the following questions.



3.2.1. Provide labels for the parts labelled **A**, **B**, **C** and **F**. (4)

3.2.2. Describe TWO differences between blood vessels labelled **A** and **F**. (4)

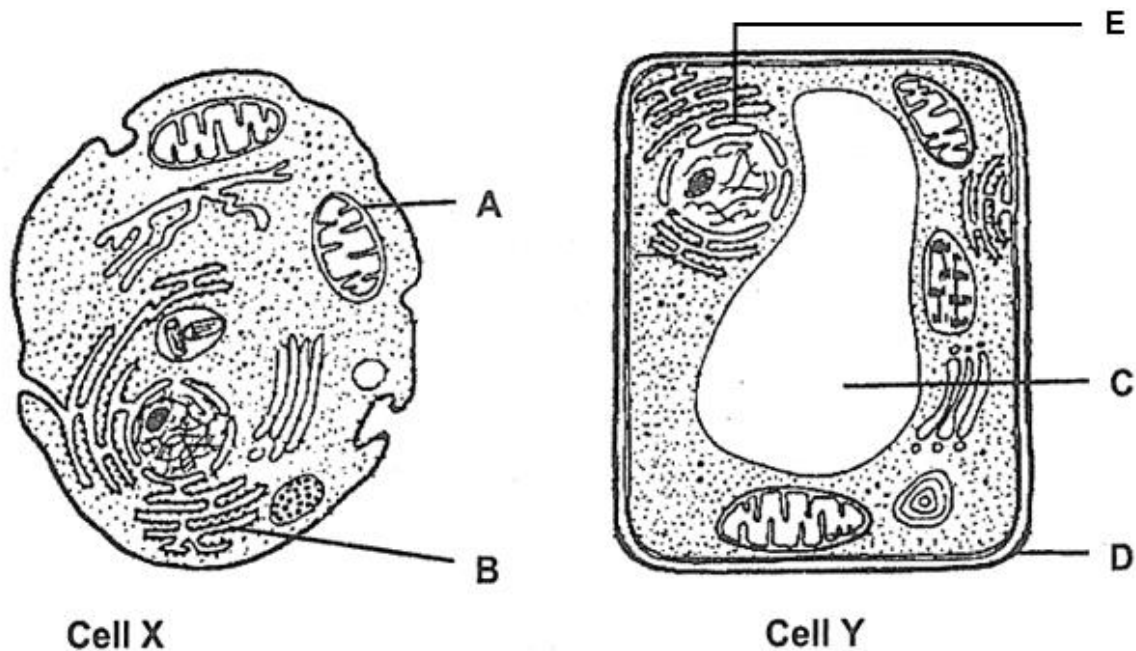
3.2.3. Identify the heart valves labelled **D** and **E**. (2)

3.2.4. Provide that **LETTER** and **NAME** of the vessels that carry deoxygenated blood to the lungs. (2)

3.2.5. Describe briefly the role that the heart plays in the circulatory system. (2)

(14)

3.3. Study the diagrams below representing two cells with their organelles.



3.3.1. Which cell, (X or Y), represents a plant cell? (1)

3.3.2. Give **TWO** visible reasons for your answer to Q 3.3.1 (2)

3.3.3. Label the organelles **A**, **B** and **E**. (3)

3.3.4. Structure **C** plays an important role in cell Y. List **ONE** function of this structure. (1)

3.3.5. Name the structure/s that:

a) Controls the entry and exit of substances. (1)

b) Are the sites of protein synthesis (1)

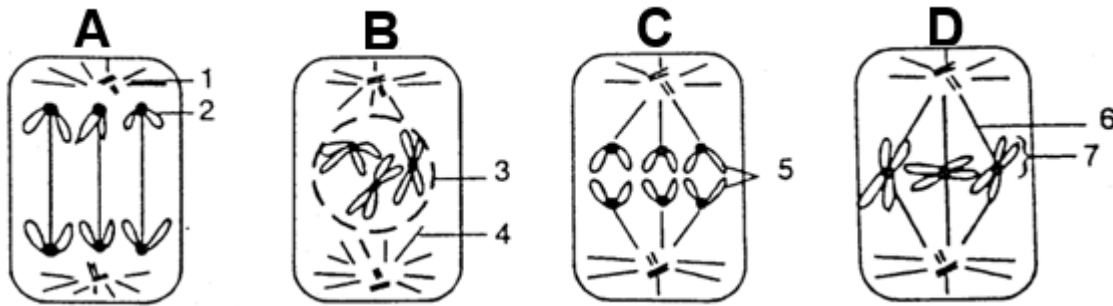
c) Is responsible for cellular respiration. (1)

3.3.6. Draw a labelled diagram of the organelle responsible for photosynthesis. (4)

3.3.7. Osmosis and diffusion are processes that occur in both plant and animal cells. Differentiate between osmosis and diffusion. (4)

(18)

3.4. Study the diagrams below which represent a number of stages of mitosis.



3.4.1. Identify the phases **A, B, C, D.** (4)

3.4.2. Identify:

a) Part 3 (1)

b) Part 7 (1)

3.4.3. At the end of mitosis, how many chromosomes will each daughter cell contain? (2)

3.4.4. Tabulate **TWO** differences between the process of cytokinesis in plant and animal cells. (5)

(13)

[SECTION B = 100 MARKS]

TOTAL = SECTION A [50] + SECTION B [100]

= 150 MARKS