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KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 10

LIFE SCIENCES

JUNE 2024

COMMON TEST

SEE ACADEMY

MARKS: 150

TIME: 2½Hours

N.B This question paper consist of 17 pages.

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INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. Answer ALL the questions.
2. Write ALL the answers in the ANSWER BOOK.
3. Start the answers to each question at the top of a NEW page.
4. Number the answers correctly according to the numbering system used in this question paper.
5. Present your answers according to the instructions of each question.
6. Do ALL drawings in pencil and label them in blue or black ink.
7. Draw diagrams, tables or flow charts only when asked to do so.
8. The diagrams in this question paper are NOT necessarily drawn to scale.
9. Do NOT use graph paper.
10. You may use a non-programmable calculator, protractor and a compass.
11. Write neatly and legibly.

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SECTION A

QUESTION 1

1.1 Various options are provided as possible answers to the following questions. Choose the correct answer and write only the letter (A to D) next to the question number (1.1.1 to 1.1.9) in your ANSWER BOOK, for example 1.1.10 D.

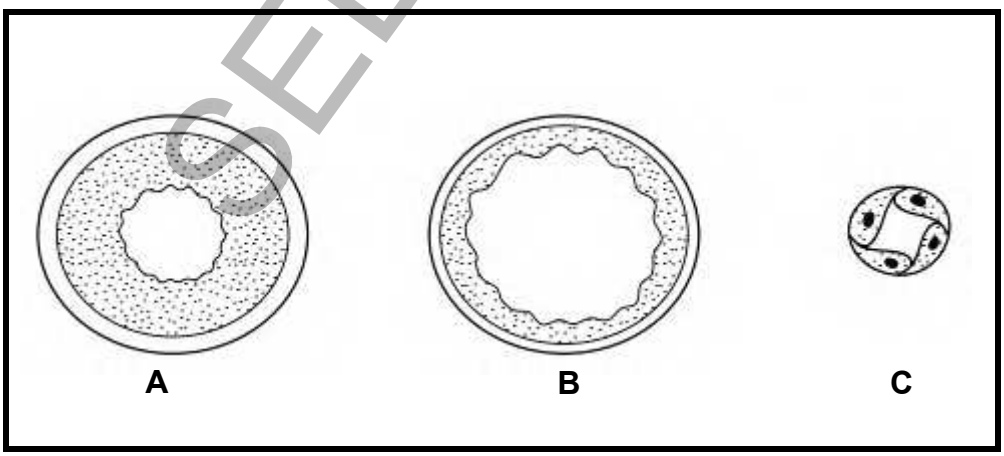
1.1.1 Calcium and phosphorus in mammals …

A forms part of nucleic acid.
B plays a role in the synthesis of proteins.
C prevents rickets.
D is involved in the formation of haemoglobin.

1.1.2 Which ONE of the following results in swelling of thyroid gland when in short supply?

A Iron
B Iodine
C Phosphorus
D Calcium

QUESTIONS 1.1.3 AND QUESTION 1.1.4 ARE BASED ON THE DIAGRAMS OF DIFFERENT BLOOD VESSELS BELOW



1.1.3 Which diagram/s or blood vessel/s connect/s arteries to veins?

A **A**
B **B**
C **C**
D **A** and **B**

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1.1.4 The main functional difference between diagram **A** and diagram **B** is that…

A both Diagram **A** and **B** carry blood away from the heart.

B both Diagram **A** and **B** carry blood back to the heart.

C diagram **A** carry blood back to the heart and diagram **B** carries blood away from the heart.

D diagram **A** carry blood away from the heart and diagram **B** carry blood back to the heart.

1.1.5 Below is a list of tissues in an angiosperm root:

(i) Parenchyma cells
(ii) Endodermis
(iii) Pericycle
(iv) Xylem

Which ONE of the following is the CORRECT order of the movement of water from the root hair to vascular tissue in the angiosperm root?

A (i)→(ii)→(iv)→(iii)
B (i)→(ii) → (iii)→ (iv)
C (ii) → (i)→ iv)→(iii)
D (iii)→(i)→(iv)→(ii)

QUESTIONS 1.1.6 AND QUESTION 1.1.7 ARE BASED ON THE INVESTIGATION BELOW

An investigation was conducted by grade 10 learners on the effect of exercise on heartbeat.

The following procedure was followed:

(i) Learners of the same age were chosen
(ii) Venue, place and time were decided
(iii) The recording tool was also decided up on
(iv) The investigation was repeated 5 times

1.1.6 Which ONE of the following combinations forms part of the planning stage in an investigation?

A (i), (iv) only
B (iv) only
C (ii), (iii) only
D (ii), (iv), (ii) only

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1.1.7 Which ONE of the following steps increased the reliability of the results?

A Learners of the same age were chosen
B Venue, time, and time were decided
C The recording tool was also decided up on
D The investigation was repeated 5 times

1.1.8 Which ONE of following organelles carries hereditary characteristics and play a role in paternity testing?

A Lysosomes
B Cell wall
C Ribosomes
D Nucleus

1.1.9 Shape of the leaves that contributes to increased rate of transpiration is…

A large and broad.
B needle shaped.
C rolled.
D small and narrower.

(2x9) **(18)**

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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 1.2.9) in your ANSWER BOOK

1.2.1 Separating wall preventing the mixing of oxygenated and deoxygenated blood

1.2.2 Part of the microscope that regulates light intensity

1.2.3 The blood vessel that transport oxygenated blood from the left ventricle to all parts of the body

1.2.4 Site of protein synthesis

1.2.5 The blood vessel that carry oxygenated blood from the lungs to the left atrium

1.2.6 The structure that allows the flow of blood in one direction only

1.2.7 Part of the microscope that supports the stage and is used to carry the microscope

1.2.8 The pressure that develops as a results of the movement of water into the root by osmosis

1.2.9 The transport of molecules across membranes against a concentration gradient, which therefore requires energy 1x9 **(9)**

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.

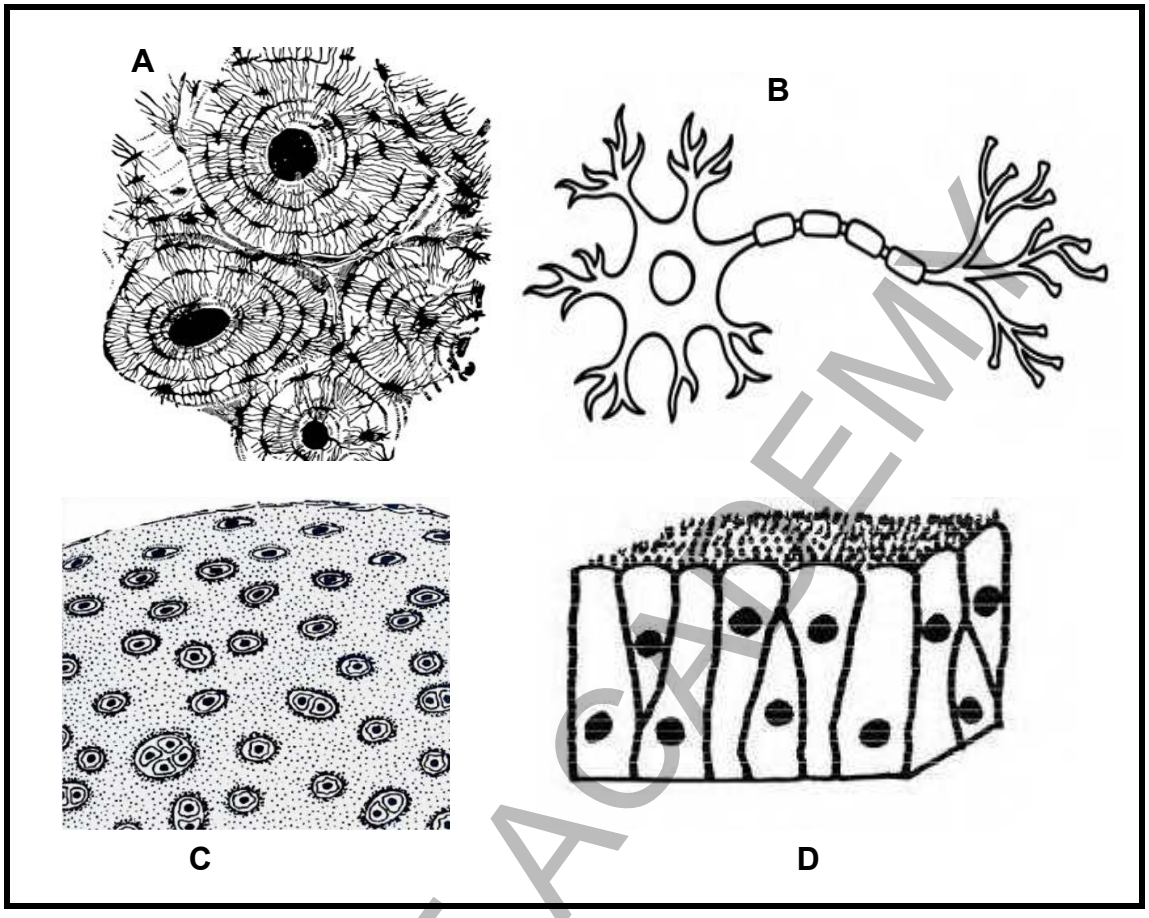
COLUMN I	COLUMNII
1.3.1 Mammalian tissue/s	A: Muscle B: Blood
1.3.2 Prevents water loss in plants	A: Waxy cuticle B: Xylem
1.3.3 Affects rate of transpiration	A: Humidity B: Light intensity
1.3.4 Selectively permeable membrane	A: Cell wall B: Nucleoplasm

(2x4) **(8)**

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1.4 The diagrams below represent animal tissues.



1.4.1 Give the LETTER and NAME of the tissue/ cells that:

(a) Contains microscopic hair-like projections lining nasal cavities and trachea (2)

(b) Carries impulses from the central nervous system to the effectors (muscles or gland) (2)

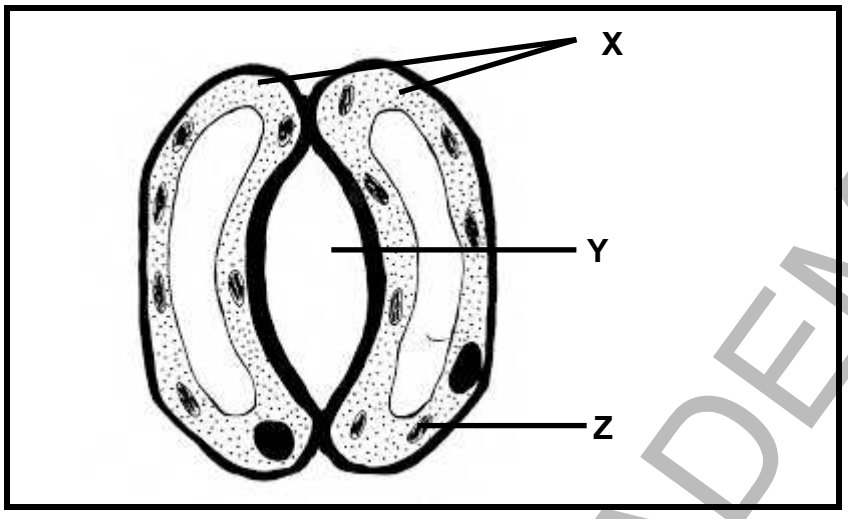
(c) Forms bones making up the skeleton of mammals (2)

(d) Prevents damage between bones in joints (2)
(8)

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1.5 The diagram below shows a surface view of a part of epidermal tissue in a leaf.



1.5.1 Identify part:

(a) **X** (1)

(b) **Y** (1)

(c) **Z** (1)

1.5.2 Name TWO processes in a plant in which this part of leaf is involved. (2)

1.5.3 Explain ONE way in which the epidermal tissue of a leaf is suited for maximum absorption of light. (2)

(7)

TOTAL QUESTION 1 [50]
TOTAL SECTION A [50]

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SECTION B

QUESTION 2

2.1 The table below shows the nutritional information printed on a cereal box.

Nutrients present in cereal	35 g of cereal contain:
Proteins	4 g
Carbohydrates	15 g
Fat	0.5 g
Iron	8 g
Vitamin B_1	2 g
Fibre (roughage)	5.5 g

2.1.1 Name the nutrient that makes up the largest part of the 35g cereal in the table. (1)

2.1.2 Name the building blocks of nutrient named in QESTION 2.1.1 (1)

2.1.3 List TWO functions of protein in the human body. (2)

2.1.4 Name an inorganic nutrient in this cereal. (1)

2.1.5 Draw a pie chart to represent the data in the table. (6)
(11)

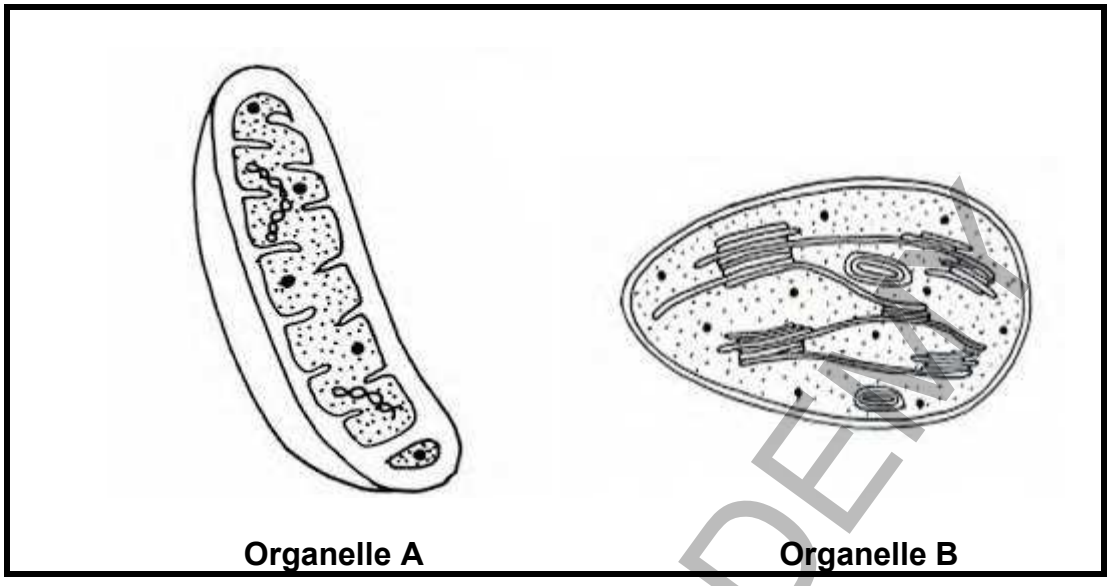
2.2 Describe how enzyme work using a lock and key model. **(5)**

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2.3 The diagrams below represent two organelles found in cells.



2.3.1 Name the fluid/gel-like material found inside organelle:

(a) **A** (1)

(b) **B** (1)

2.3.2 Name the part in organelle **B** in which the pigment responsible for the absorption of light is found. (1)

2.3.3 Explain why a muscle cell would generally need more of organelle **A.** (2)

2.3.4 Tabulate TWO differences between organelle **A** and organelle **B** with regard to **location** and **function.** (5)

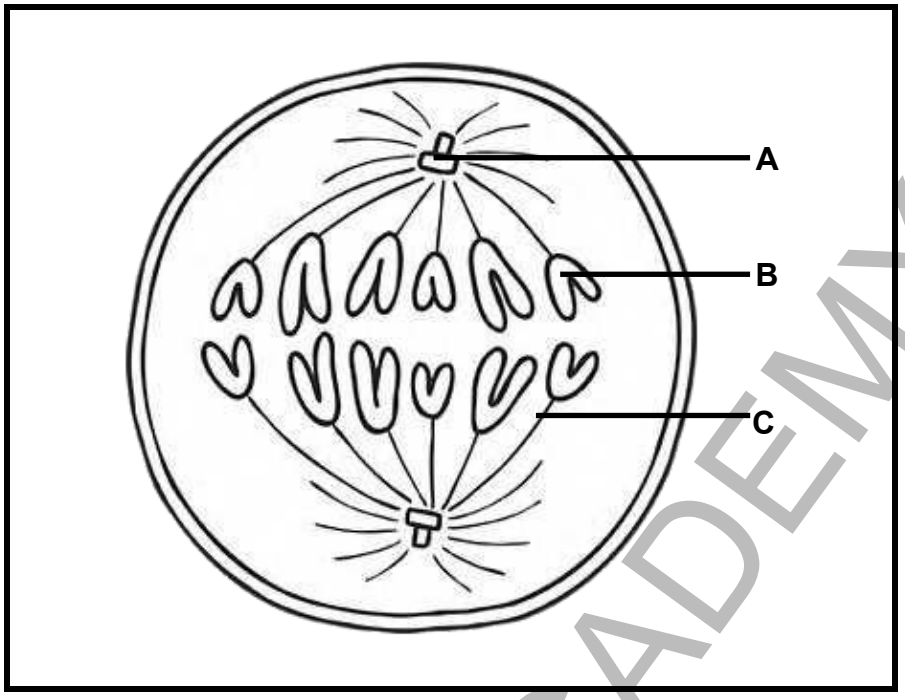
2.3.5 Calculate the actual size of the micrograph of organelle **B** in micrometres if the measured size of the image using a ruler is 86mm and the electron microscopic magnification is 4000x. (3)

(13)

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2.4 The diagram below shows a phase in mitosis.



2.4.1 Identify:

(a) The phase represented above. (1)

(b) Part **B** (1)

(c) The LETTER only of the part that forms spindle fibres. (1)

2.4.2 Name the disease caused by an abnormal and uncontrollable division of cells in a part of a body. (1)

2.4.3 State how many chromosomes will be present at the end of this cell division. (1)

2.4.4 Explain the effect on mitosis if part **C** fails to perform its function during cell division. (2)

2.4.5 Draw a diagram to represent the phase of mitosis that occurs before the one shown above (4)
(11)

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2.5 Read the extract below.

One of the most important functions of parenchyma cells is that of healing and repair. Parenchyma cells are unique in their *meristematic* nature. This means that the cells are *pluripotent*, having the ability to divide into a number of different cells. This plays an important role in how a plant can heal itself after a wound. While it may seem silly to think that a tree heals, the process is not much different to healing in a human body.

Parenchyma cells, once exposed to the outside when a wound occurs, are stimulated to start dividing. The cells divide towards the wound, differentiating into the different cell types which are needed, such as bark and epidermis. The parenchyma cells on the inside of the wound remain undifferentiated, and provide a source of meristematic cells in case the plant is attacked again. This process is responsible for healing in plants, from giant trees to a blade of grass.

2.5.1 Define the term *meristematic* tissue. (2)

2.5.2 From the extract above:

(a) Give TWO functions of parenchyma cells. (2)

(b) Explain why the parenchyma cells on the inside of the wound would remain undifferentiated. (2)

2.5.3 State TWO functions of parenchyma cells other than the one's from the extract. (2)

2.5.4 Name TWO types of cells mentioned in the extract that parenchyma cells would differentiate into. (2)

(10)

TOTAL QUESTION 2 [50]

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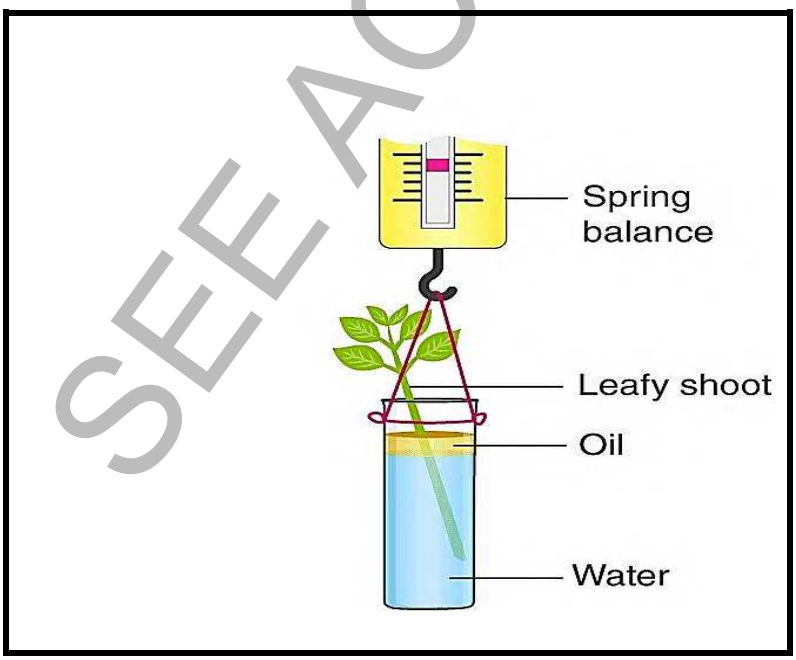
QUESTION 3

3.1 An investigation was done to determine the effect of temperature on the rate of transpiration.

The procedure was as follows:

- Four measuring cylinders (**A**, **B**, **C** and **D**) were set up as the one shown in the diagram.
- The four cylinders were left in the laboratory but were exposed to different temperatures.
- Temperature was measured in the four cylinders, using a thermometer.
- Each measuring cylinder contained a leafy twig and 80 ml water covered with a layer of oil.
- After two hours, water levels in the four cylinders were measured using the spring balance and recorded.
- Investigation was repeated 4 times.

The diagram below shows the setup of the investigation.



The table below shows the results that were obtained.

Cylinders	Temperatures(°C)	Water left in the beaker (ml)
A	15	70
B	25	65
C	35	56
D	45	45

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3.1.1 Identify:

(a) Dependent variable (1)

(b) Independent variable (1)

3.1.2 Explain the purpose of the oil layer (2)

3.1.3 Explain ONE factor/precaution that needs to be taken when cutting the leafy twigs, to ensure the results are valid. (2)

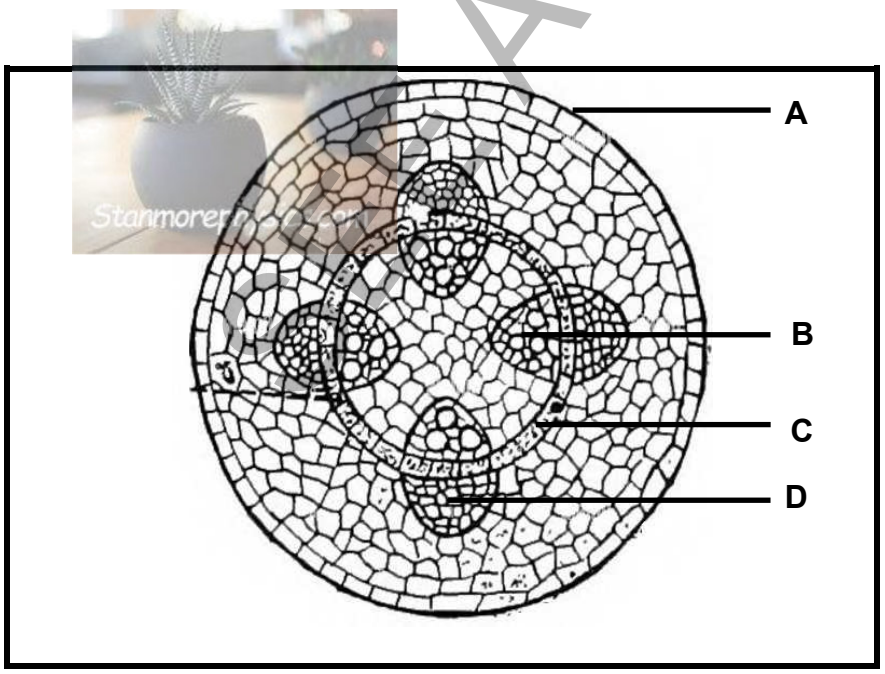
3.1.4 State TWO factors that should have been kept constant during this investigation other the one stated in the investigation. (2)

3.1.5 Explain the implications on the leafy twig after 4 hours should the rate of transpiration continues at the constant rate for cylinder **D.** (3)

3.1.6 A Fifth cylinder was added (cylinder **E**). Its leafy twig has hairs on its leaves. Explain how would the presence of hairs affect the rate of transpiration. (3)

(14)

3.2 The diagram shows a cross section of a dicotyledonous stem.



3.2.1 Identify part **C.** (1)

3.2.2 Describe how the structure of part **A** is suited for protection in young green plants. (3)

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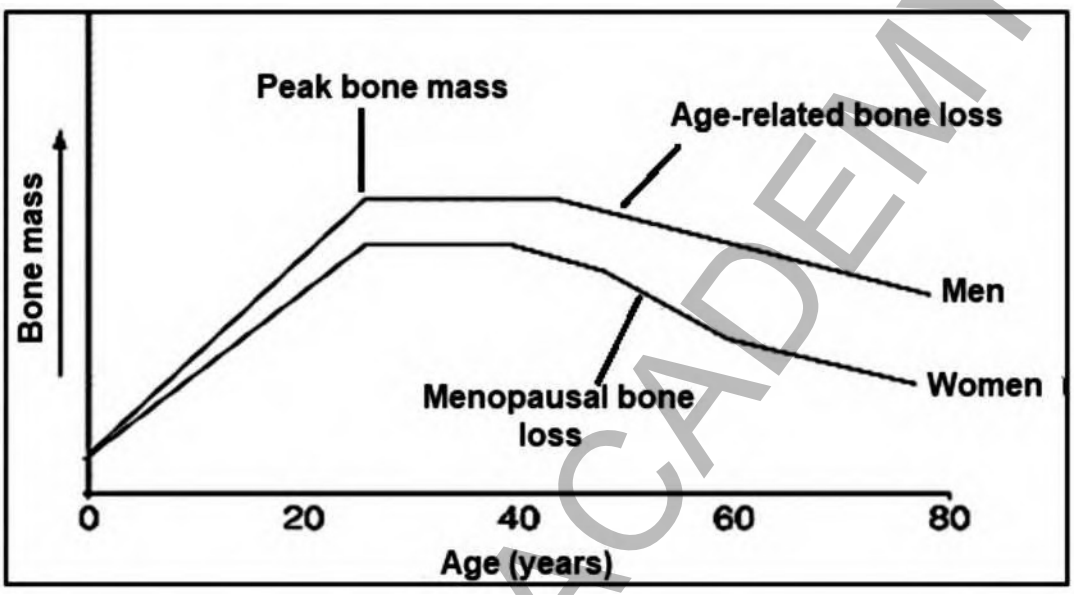
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3.2.3 Give ONE function of part **D** (1)

3.2.4 Explain TWO reasons in which part **B** is structurally suited to transport water in plants. (4)

(9)

3.3 The graph below shows bone mass in men and woman of different age.



3.3.1 From the graph, state the ff:

(a) the age when the peak of bone mass/density starts to form in men. (1)

(b) the reason for bone loss in women. (1)

3.3.2 Describe the relationship between bone density and age (2)

3.3.3 Give TWO reasons why exercise and calcium-rich foods can lower the risk of developing low bone density. (2)

3.3.4 The cranium is part of the human skeleton.

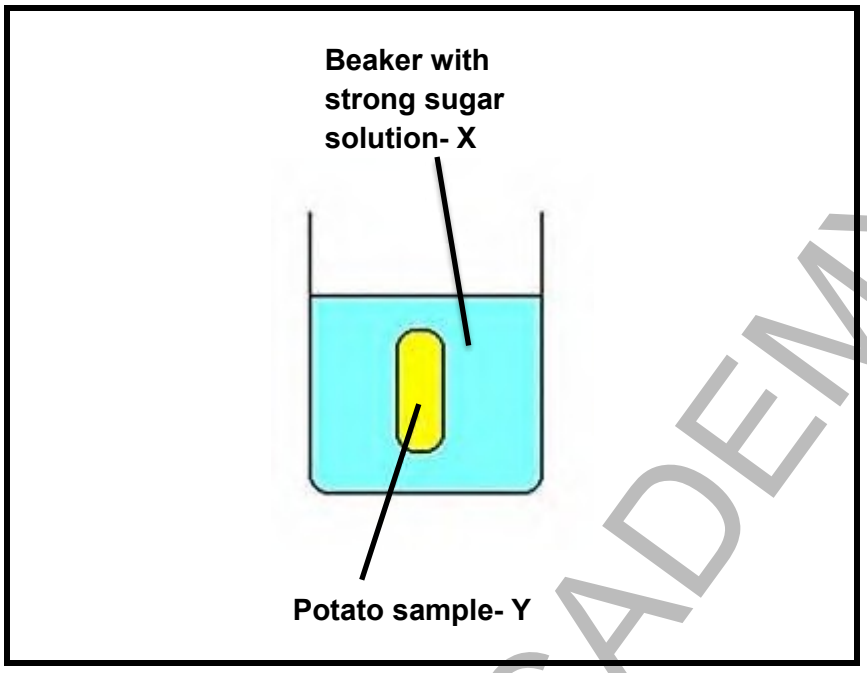
(a) Name the part of the body that is protected by the cranium. (1)

(b) Apart from protection, list any other THREE functions of a skeleton. (3)
(10)

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3.4 The diagram below shows a certain type of diffusion that involves movement of water molecules.



3.4.1 Identify the above type of diffusion. (1)

3.4.2 State whether the water will move from the beaker to the potato or from the potato to the beaker (**X** to **Y** or **Y** to **X**). (1)

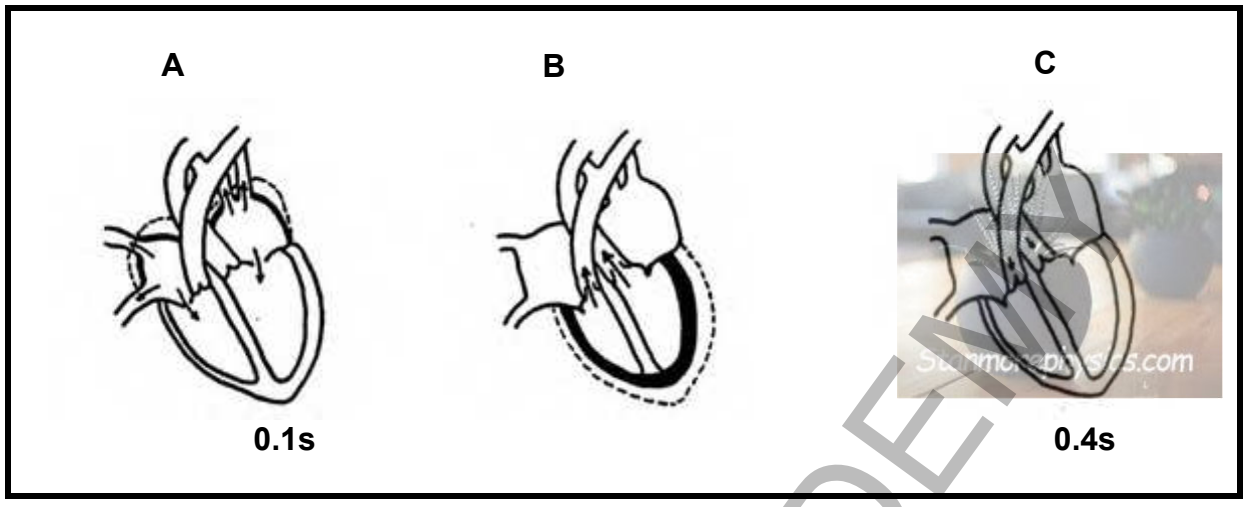
3.4.3 Explain your answer in QUESTION 3.4.2. (3)

3.4.4 Explain the results in relation to size of potato after 24 hours. (4)
(9)

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3.5 The diagram below shows the three phases of cardiac cycle and how long each phase last. Each cycle last 0.8 seconds



3.5.1 Identify phase **A.** (1)

3.5.2 State how long does phase **B** last according to the data given. (1)

3.5.3 Describe how cardiac cycle works with reference to the diagrams.

(a) **A** (1)

(b) **B** (3)

(c) **C** (2)

(8)

TOTAL QUESTION 3 [50]
TOTAL SECTION B 100
GRAND TOTAL 150

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