BERGVLIET HIGH SCHOOL

Grade 10 **LIFE SCIENCES NOVEMBER PAPER 1 EXAM** **15 Nov 2024**

Time: 2½ hours **150 Marks**

Examiner: Mrs. M. Brouwer

Moderators: S. Lambrechts, G. O'Connor and M. Wentworth

Name: _____

Life Sciences Teacher: _____

SECTION A	**Q1**	**50**			
SECTION B	**Q2**	**50**			
	Q3	**50**			
TOTAL		**150**			**%**

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. Answer ALL the questions. There are **16** pages in total.
2. Write ALL the answers on FOOLSCAP PAPER.
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 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 must use a non-programmable calculator, protractor and a compass, where necessary.
11. Write neatly and legibly.

DETACH THIS SHEET AND STAPLE IT TO THE FRONT OF YOUR FOOLSCAP

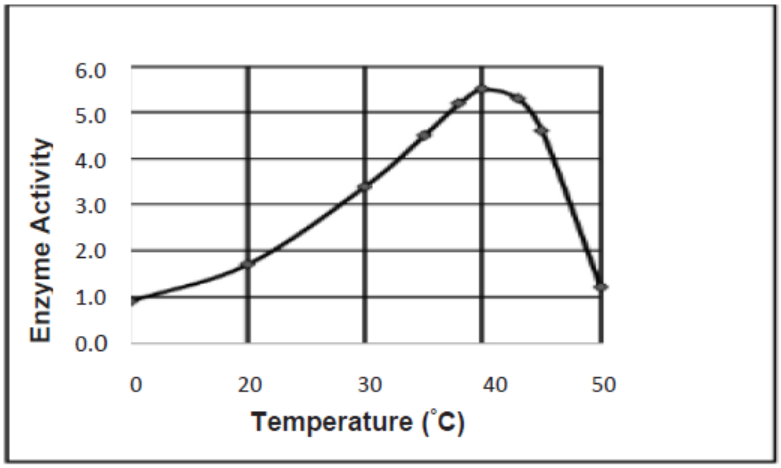
Name: _____ Teacher: _____

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.

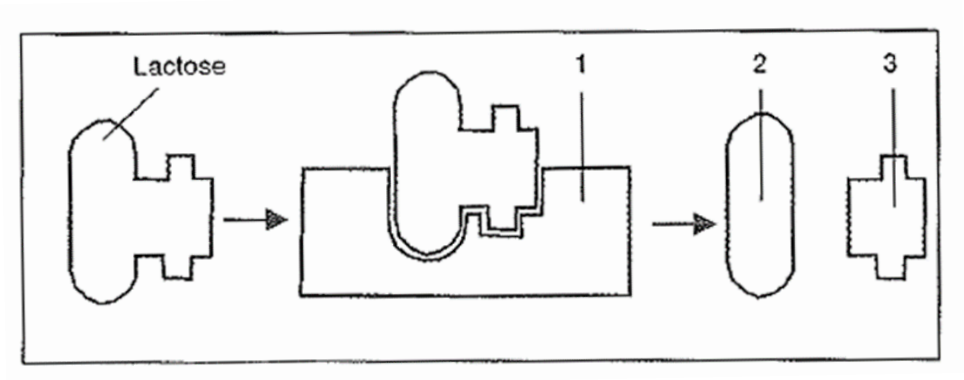
1.1.1. The graph below shows the effect of temperature on enzyme activity.



What conclusion can be made from the graph above?

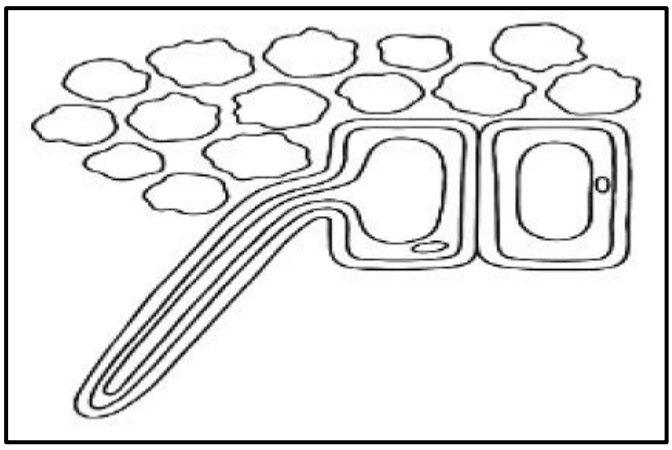
A. The higher the temperature, the higher the rate of enzyme activity.
B. Enzymes become denatured by high temperatures.
C. An increase in enzyme activity causes temperature to rise.
D. Enzymes function well at extremely low temperatures.

1.1.2. Which of the following correctly identifies 1, 2 and 3 respectively.



A. Substrate, glucose and galactose
B. Enzyme, glucose and fructose
C. Substrate, glucose and fructose
D. Enzyme, glucose and galactose

1.1.3. Study the diagram below.



The main function of the plant organ in the diagram above is …

A. transportation of water from roots to leaves.
B. storage of water and mineral salts.
C. increasing surface area for absorption of water.
D. movement of substances throughout the plant.

1.1.4. The tendency of liquids to move up narrow tubes is called …

A. capillarity.
B. transpiration.
C. root pressure.
D. transpiration pull.

1.1.5. A leaf that is likely to lose water at the highest rate, is one…

A. with a very thin cuticle.
B. which is hairy.
C. with very few stomata.
D. with a shiny cuticle.

1.1.6. The tissue between the upper and lower epidermis in leaves is known as …

A. cuticle.
B. mesophyll.
C. stomata.
D. sclerenchyma.

1.1.7. A nerve impulse in the axon of a sensory neuron is conducted …

A. towards the receptor.
B. towards the cell body.
C. away from the cell body.
D. away from the effector.

1.1.8. Which of the following are examples of connective tissues?

(i) Squamous tissue
(ii) Blood tissue
(iii) Cuboidal tissue
(iv) Tendons

A. (i) and (ii) only
B. (ii) and (iii) only
C. (iv) only
D. (ii) and (iv) only

1.1.9. Which structure is NOT part of the axial skeleton?

A. Sternum
B. Clavicle
C. Vertebral column
D. Mandible

1.1.10. Which animal does NOT have a hydrostatic skeleton?

A. Jellyfish
B. Earthworm
C. Beetle
D. Sea slug

(10 x 2) /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. The specific tissue that loosely connects the skin to the underlying muscles, as well as serves as a packaging tissue in animals.

1.2.2. Cartilage cells.

1.2.3. The phase of the cell cycle during which DNA replication occurs.

1.2.4. Modified epidermal cells that control the opening and closing of the stomatal pore.

1.2.5. The type of muscle tissue found in the alimentary canal of the digestive system and blood vessels.

1.2.6. The second vertebra in the vertebral column.

1.2.7. Nutrient overload in water bodies that results in algal bloom.

1.2.8. Fats that are solid at room temperature.

1.2.9. Small canals in bone tissue, passing through the lamellae, connecting lacunae.

1.2.10. The loss of water vapour through the aerial parts of plants, mainly through the stomata.

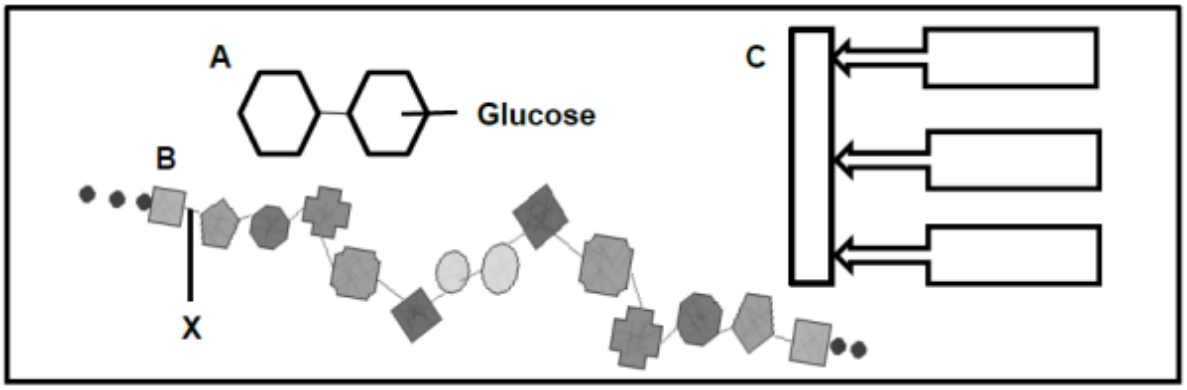
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1.3. Indicate whether each of the descriptions in COLUMN I applies to **A ONLY**, **B ONLY**, **BOTH A AND B** or **NONE** of the items in COLUMN II. Write **A only**, **B only**, **both A and B**, or **none** next to the question number.

COLUMN I	COLUMN II
1.3.1. Connects muscle to bone.	A. Ligament
	B. Tendon
1.3.2. The pathway where water travels through the cell walls of roots.	A. Apoplast
	B. Symplast
1.3.3. The plant organ in which the pith is located in the center.	A. Root
	B. Stem

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1.4. The diagrams below show different organic compounds.



1.4.1. Identify organic compounds labelled **A**, **B** and **C** respectively. (3)

1.4.2. Identify the type of bond labelled **X**. (1)

1.4.3. Name the monomers (building blocks) of compound **B**. (1)

1.4.4. Give the LETTER of the compound that…

a) has a hydrogen to oxygen ratio of 2:1. (1)

b) will test positive when the Biuret test is performed. (1)

c) serves as an energy-rich reserve fuel. (1)

d) will test positive when the Benedict's test is performed. (1)

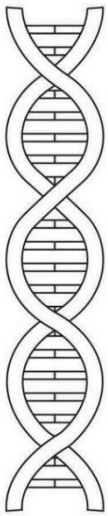
e) is sensitive to changes in pH. (1)

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1.5. Study the diagram of two nucleic acids below.



X



Y

1.5.1. Are nucleic acids *inorganic* or *organic* compounds? (1)

1.5.2. Identify nucleic acids **X** and **Y** respectively. (2)

1.5.3. Name the monomer of a nucleic acid. (1)

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TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1. The table below shows an analysis of the nutrients found in a 100g portion of breakfast. The breakfast consists of eggs, bread and butter.

NUTRIENTS IN A 100g PORTION	FOOD TYPES		
	Eggs	Bread	Butter
Carbohydrates (g)	0,0	20,2	0,1
Fats (g)	12,5	0,2	85,2
Protein (g)	11,8	2,5	0,0
Calcium (mg)	56,0	3,3	13,8
Iron (mg)	2,8	0,6	0,15
Vitamin A (mg)	675,0	12,0	2344,0
Vitamin C (mg)	0,0	57,0	0,20
Vitamin B_1 (mg)	0,7	0,2	0,0

2.1.1. Name ONE **nutrient** that is essential for the manufacturing of enzymes. (1)

2.1.2. Identify the **food type** that would be best for a person who suffers from night-blindness. Give a reason for your answer. (2)

2.1.3. Calculate the amount of iron found in a 500g serving of the above breakfast. Show ALL your calculations. (3)

2.1.4. Which **nutrient** will prevent…

a) Beriberi? (1)

b) Scurvy? (1)

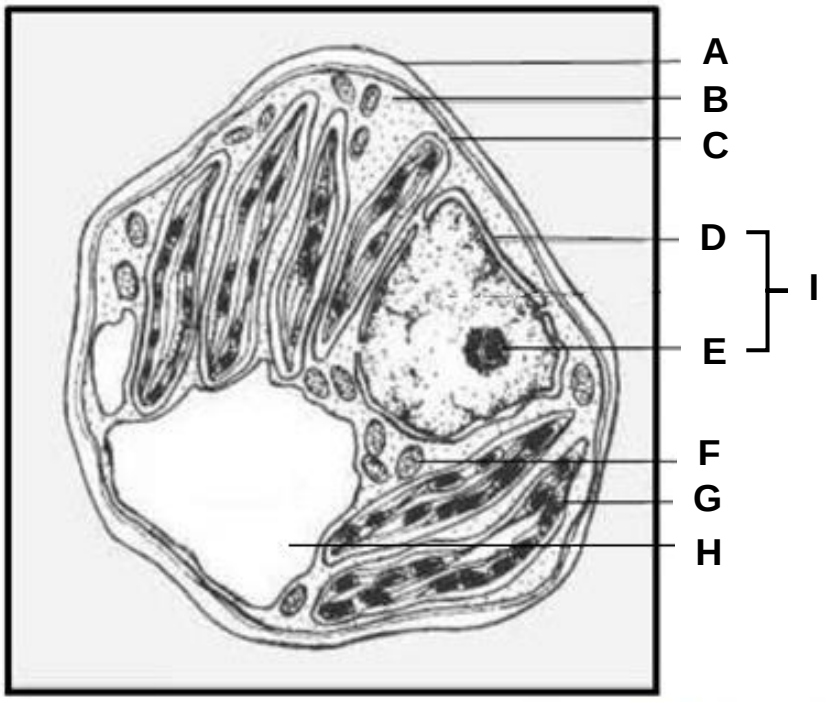
c) Anemia? (1)

2.1.5. Explain why an athlete should include bread in his/her breakfast. (2)

2.1.6. Identify TWO water-soluble vitamins. (2)

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2.2. Study the electron micrograph of a typical cell below and answer the questions that follow.



[Source: https://www.Studyblue.com]

2.2.1. Is the cell above an animal or plant cell? (1)

2.2.2. Provide TWO visible reasons to support your answer to QUESTION 2.2.1. (2)

2.2.3. Name the polysaccharide that makes up part **A**. (1)

2.2.4. Give the LETTER of the part:

a) that contributes to turgor pressure. (1)

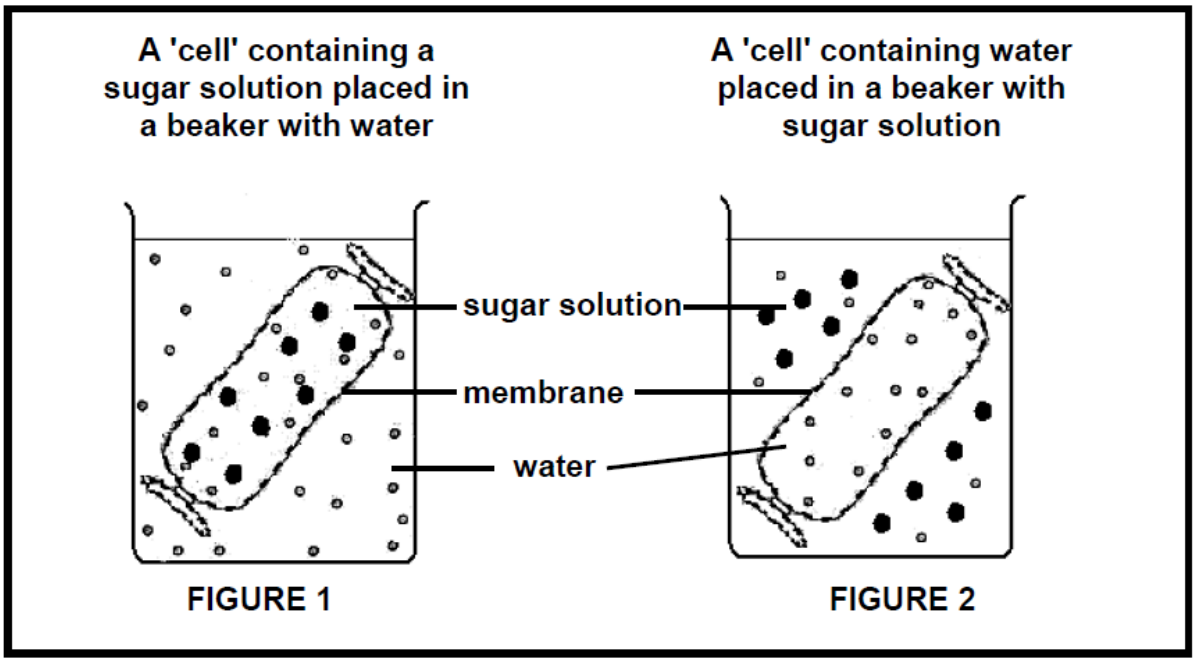
b) that controls all cellular activities. (1)

c) in which photosynthesis occurs. (1)

2.2.5. Part **C** consists of a double layer of molecules. Draw and label ONE of these molecules. Your heading should be the name of the molecule. (4)

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2.3. The diagrams below illustrate a process through a selectively permeable membrane.



2.3.1. Name the process represented in the diagrams. (1)

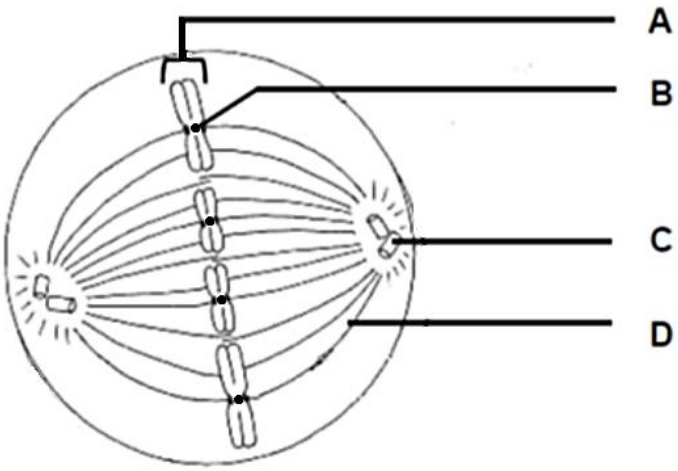
2.3.2. Explain what is meant by a *selectively permeable* membrane? (2)

2.3.3. Explain what would happen to the 'cell' in FIGURE 2 after some time, by indicating the direction in which water moved and why. (4)

2.3.4. In what type of solution, *hypertonic*, *isotonic* or *hypotonic*, is the 'cell' in FIGURE 1 placed in? (1)

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2.4. Study the diagram of a phase of mitosis below and answer the questions that follow.



2.4.1. Identify the phase of mitosis in the diagram above. (1)

2.4.2. Provide ONE visible reason to support your answer to QUESTION 2.4.1. (1)

2.4.3. Identify the parts labelled **A**, **B**, **C** and **D**. (4)

2.4.4. State TWO reasons why mitosis is a biologically important process. (2)

2.4.5. Draw the cell above as it would appear in the phase immediately AFTER the one shown above. (4)

2.4.6. How many chromosomes will be present in each of the cells at the end of mitosis shown in the diagram. (1)

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2.5. Read the extract below and answer the questions that follow.

> A common misconception is that cancer is incurable. With early diagnosis and proper treatment, the chances of survival can be good.
> However, once cancer spreads to other parts of the body, it is difficult to treat and to cure. Nowadays, the treatment used to destroy cancer cells could be radiation therapy, which is the use of high-energy rays to destroy cancer cells, or chemotherapy that uses chemicals to destroy cancer cells. Some side-effects of these treatments may be loss of hair and nausea.

2.5.1. Define *cancer*. (1)

2.5.2. Give TWO reasons why you think that there are more people who suffer from cancer nowadays compared to 30 years ago. (2)

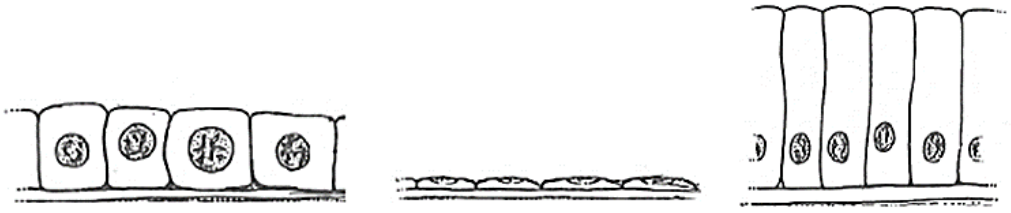
2.5.3. Name TWO side-effects of cancer treatments. (2)

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QUESTION 3

3.1. The diagrams below represent animal tissues. Study them carefully and answer the questions that follow.



X Y Z

3.1.1. Identify tissues **X**, **Y**, and **Z**. (3)

3.1.2. Give TWO functions of tissue **X**. (2)

3.1.3. Give the **LETTER** of the tissue located in the…

a) lining of blood vessels.

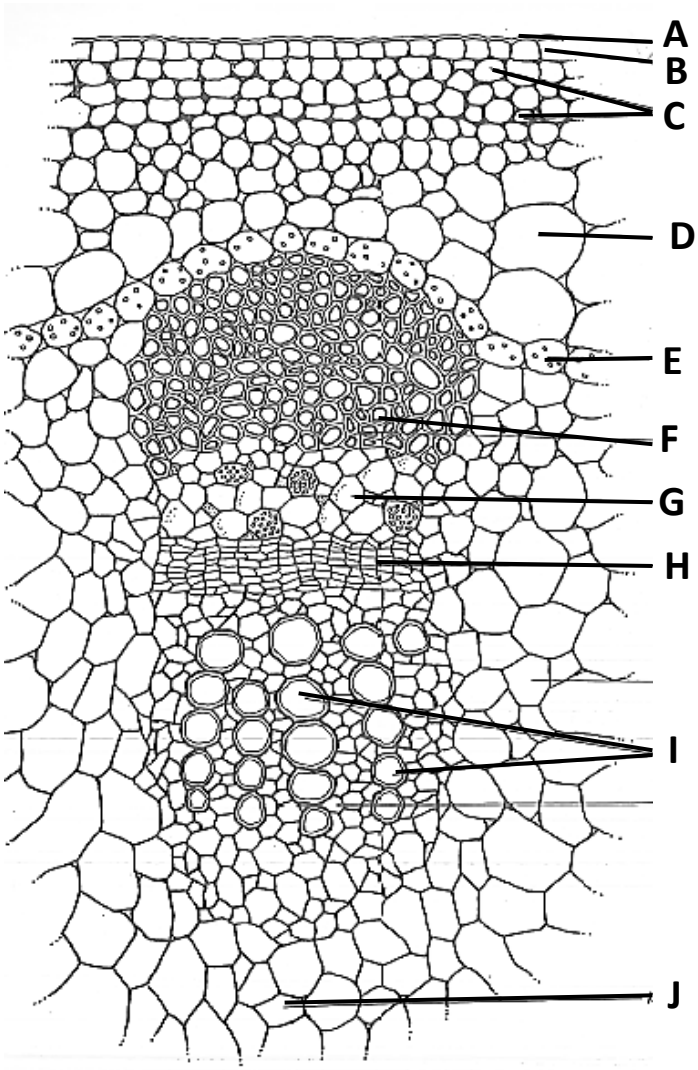
b) walls of sweat glands and kidney tubules.

c) lining of the stomach and small intestine. (3)

3.1.4. Name the specialized cells found in tissue **Z** (not shown in this diagram) AND provide their function. (2)

/10/

3.2. Study the diagram below showing a portion of a plant organ



3.2.1. Identify the plant **organ** represented in the diagram above. (1)

3.2.2. Provide ONE reason for your answer in QUESTION 3.2.1. above. (1)

3.2.3. Provide the LETTER representing lateral meristematic tissue. (1)

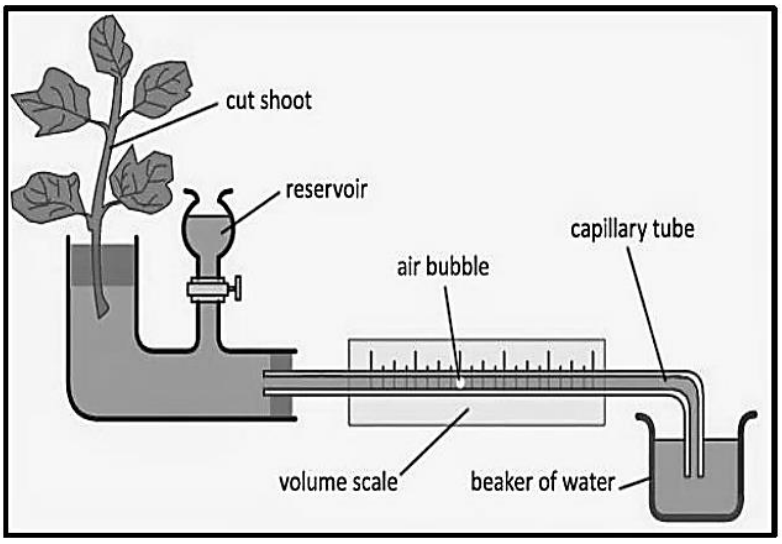
3.2.4. Identify tissues **D** and **G**. (2)

3.2.5. Tabulate TWO structural differences between sclerenchyma and collenchyma tissue. (5)

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3.3. An investigation was performed to determine how temperature affects transpiration rate.

The apparatus used in the investigation is shown below.



3.3.1. Provide the name of the apparatus illustrated above. (1)

3.3.2. Predict what would happen to the speed of movement of the air bubble if Vaseline was applied to the lower surfaces of all the leaves. Explain your answer. (3)

3.3.3. State a hypothesis for this investigation. (2)

3.3.4. Identify:

a) the independent variable

b) the dependent variable (2)

The results of the investigation are show in the table below.

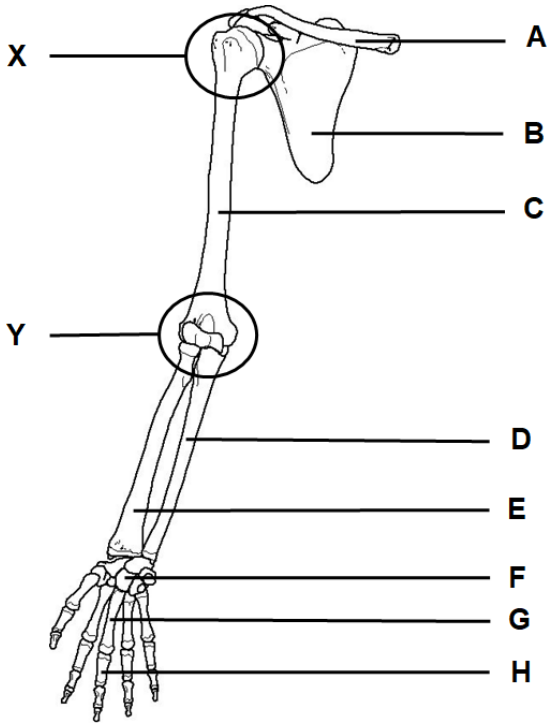
Temperature °C	22	25	27	28	30
Transpiration rate (m mol/m^2 sec)	1,5	3,5	5	4,5	4

3.3.5. Plot a line graph using the data provided in the table above. (6)

3.3.6. What can you conclude about the relationship between temperature and the rate of transpiration? (2)

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3.4. Study the diagram of a portion of the human skeleton below, and answer the questions that follow.



3.4.1. Give the **LETTERS** of the bones that make up the pectoral girdle only. (2)

3.4.2. Provide labels for the bones **B**, **D** and **G**. (3)

3.4.3. Identify the type of joints labelled **X** and **Y,** AND state the difference in the type of movement they provide. (4)

3.4.4. Joints **X** and **Y** are types of synovial joints. Describe how the structure of synovial joints allows frictionless movement between the bones. (3)

3.4.5. Provide TWO functions of the human skeleton. (2)

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[50]

TOTAL SECTION B: 100

GRAND TOTAL: 150 MARKS