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LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
EDUCATION



NATIONAL SENIOR CERTIFICATE

GRADE 10

LIFE SCIENCES

JUNE EXAM 2022

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MARKS: 150

TIME: 2½ HOURS

This question paper consists of 15 pages

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INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions
2. Write ALL the answers in the ANSWER BOOK.
3. Start the answer 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 black or blue 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. Only a non-programmable calculator, protractor and a compass must be used where necessary.
11. Write neatly and legibly.

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SECTION A

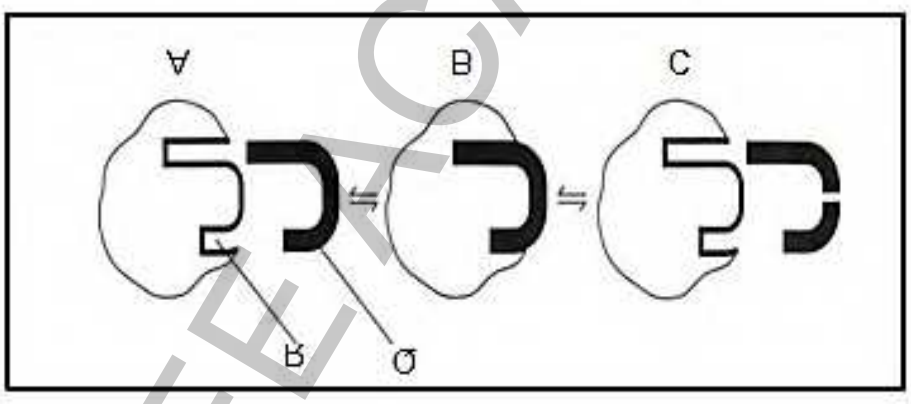
QUESTION 1

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 1.1.10) in the ANSWER BOOK, e.g. 1.1.11 B

1.1.1 The organelle where proteins are synthesised:

A nucleus
B ribosomes
C cytosol
D mitochondria

Questions 1.1.2- 1.1.4 are based on the figure below.



1.1.2 Part R represents the:

A Enzyme
B Active site
C Substrate
D Catalyst

1.1.3 Part Q represents the:

A Enzyme
B Active site
C Substrate
D Amino acid

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1.1.4 Which property of enzymes is illustrated by the diagram?

A Enzymes are sensitive to temperature

B Enzymes are protein in nature

C Enzymes are sensitive to pH

D Enzyme acts on one substrate only.

1.1.5 An inorganic constituent of protoplasm is….

A water

B starch

C cholesterol

D haemoglobin

1.1.6 The organelle that plays a role in cell division is …

A centrosome

B vacuole

C chloroplast

D ribosomes

1.1.7 Cell division associated with growth in an organism, is called

A asexual reproduction

B budding

C meiosis

D mitosis

.1.8 Companion cells in plants are distinctive of

A phloem tissue

B xylem tissue

C chlorenchyma tissue

D sclerenchyma tissue

1.1.9 A motor neuron carries a nerve impulse to…

A a receptor

B an effector

C the brain

D the cell body

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1.1.10 Fluid mosaic model is a characteristic of…….

A cell wall

B tonoplast

C nuclear membrane

D cell membrane 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 1.2.7)

1.2.1 Swelling of thyroid gland due to lack of iodine.

1.2.2 Structure within the nucleus that contain genetic material

1.2.3 The structure that connects 2 chromosomes together during cell Division

1.2.4 Parenchyma cells that contain chloroplasts

1.2.5 Long, coil thread-like structures made up of DNA that are found in the nucleus

1.2.6 Vascular tissue that transport water present in the veins of the leaf

1.2.7 The structural and functional unit of life

(7)

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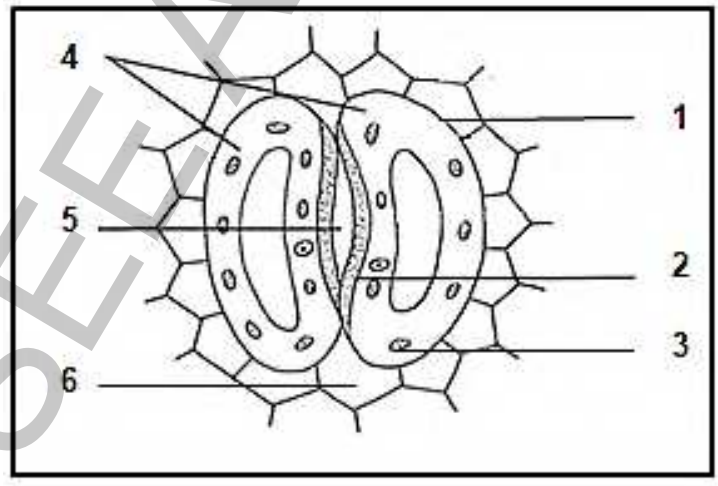
1.3 Indicate whether each of the statements in COLUMN 1, applies to A ONLY, B ONLY, BOTH A and B, or Neither A nor B of the items in column II. Write A only, B only, Both A and B, or Neither A nor B.

COLUMN 1	COLUMN II
1.3.1 Strong bone and teeth development	A: Vitamin D B: Calcium
1.3.2 Compound in which carbohydrates are stored in animal cells.	A: glycogen B: starch
1.3.3 Tissue has a support function	A: Epidermal tissue B: Collenchyma Tissue
1.3.4 Nutrients that are required in large amount	A: micronutrient B: macronutrient

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(4x2) **= (8)**

1.4 Study the diagram below and answer the questions that follow.



1.4.1. Identify the tissue illustrated (1)

1.4.2. Name TWO processes in which this tissue is involved. (2)

1.4.3. Identify the parts numbered 1-5. Write the number and its label. (5)

1.4.4 State **ONE** ways in which the leaf is structurally suited for its function. (1)

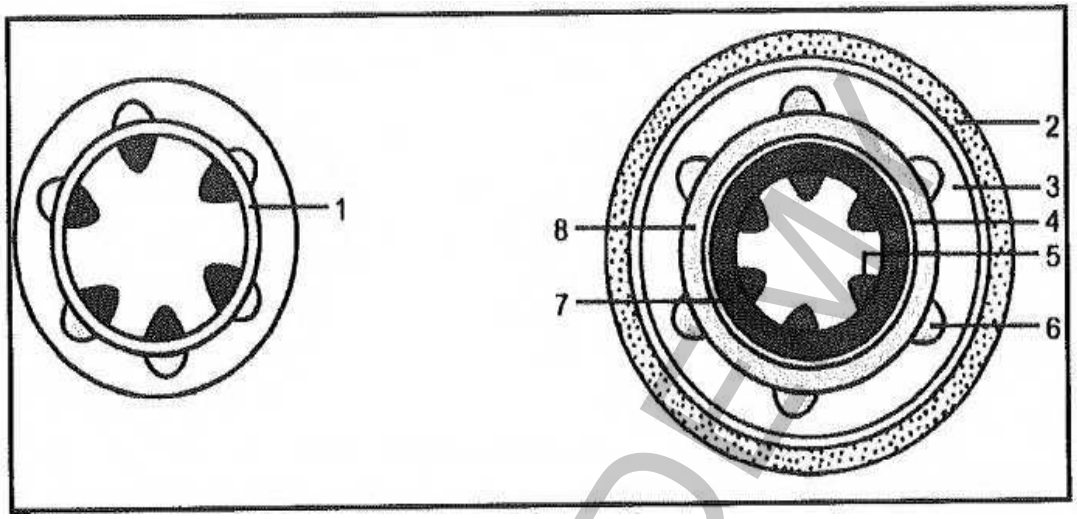
(9)

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1.5 Study the diagrams below and answer the questions that follow.



1.5.1 Identify the process represented by the diagrams above. (1)

1.5.2 Give the number and the name of the tissue transporting organic food. (3)

1.5.3 Give the function of part

(a) number 1 (1)

(b) number 2 (1)

(6)

TOTAL SECTION A: 50

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SECTION B

QUESTION 2

2.1 Study the table below which shows the composition of certain food types in the human diet per 100g units and answer the questions that follow.

Food type	Energy (KJ)	Proteins (g)	Fats (g)	Carbo-hydrates (g)	Calcium (mg)	Iron (mg)	Vit A (Ug)	Vit C (Ug)
Bacon	1983	18,0	52,0	0	15	0	0	0
Beans	376	7,0	0,4	22,0	65	2,4	298	0
Bread	1072	8,8	1,4	58,1	102	1,8	0	0
Butter	3230	0,2	87,3	0	1,7	0	2015	1,5
Milk	281	3,9	4,6	5,4	129	0,15	87	0,1

2.1.1 Which food type supplies the most in the nutritional needs of the body? Support your answer with evidence from the table. (3)

2.1.2 Which food type provides the most energy per unit mass? Justify your answer. (2)

2.1.3 Which of the food types above would be the most beneficial for?

(a) growth and development
(b) preventing Osteomalacia
(c) normal night vision
(d) preventing anaemia
(e) preventing bleeding gums (5)

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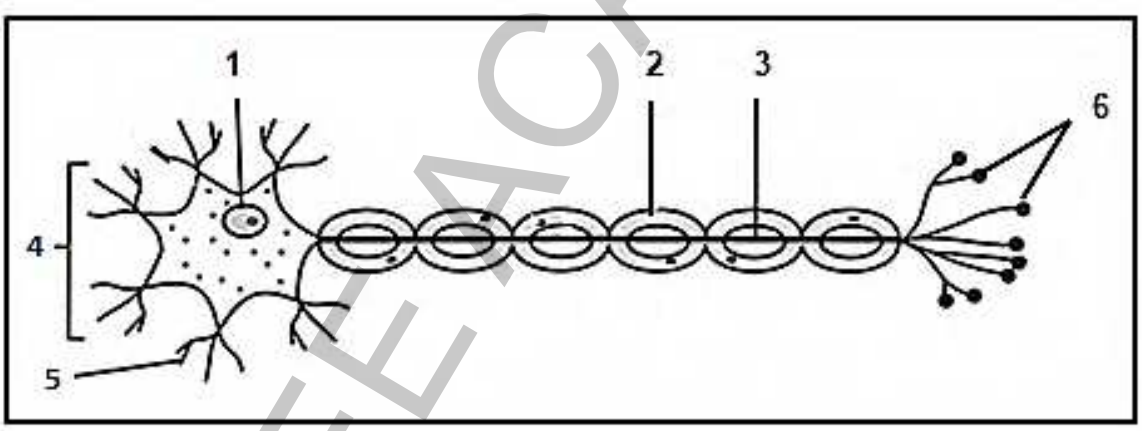
2.1.4 Certain washing powders are described as 'biological washing Powders' because they contain enzymes. These washing powders are good for removing stains such as egg, chocolate, blood and gravy. In some instances these enzymes are obtained from a type of bacterium. These enzymes are somewhat unusual in that they work optimally (best) at a temperature of 60ºC.

(a) Why are these ' biological washing powders' more effective Than ordinary washing powders at removing the types of stains Made by egg, chocolate, blood and gravy? (3)

(b) Explain why is unusual for an enzyme to have an optimal temperature of 60ºC. (3)

(16)

2.2 The following diagram represents a type of nerve tissue. Study the diagram and answer the questions that follow.



2.2.1 What type of nerve tissue is illustrated above? (1)

2.2.2 What is the function of this type of nerve tissue in the human body? (4)

2.2.3 Identify the parts numbered 1 to 5 (5)

2.2.4 State ONE function of the parts numbered:

(a) 5 (1)

(b) 2 (1)

(c) 6 (1)

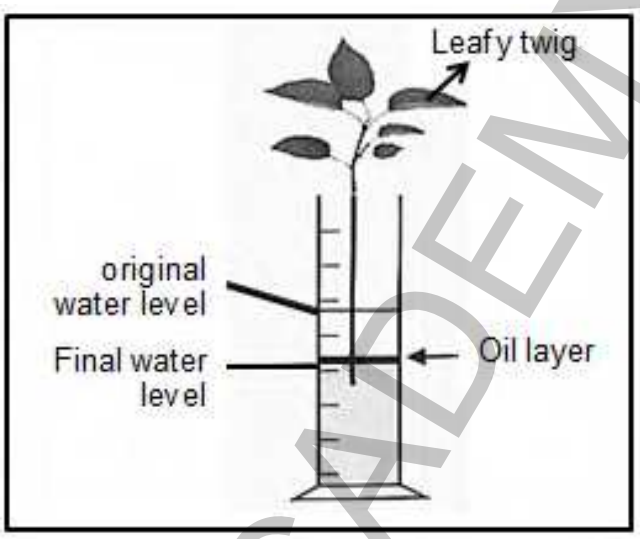
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2.2.5 What is the name of the site of contact between two consecutive nerve fibres? (1)

(14)

2.3 Four measuring cylinders, A, B, C and D were set up as the one shown in the diagram.



Each measuring cylinder contained a leafy twig and 80 ml water covered with a layer of oil.

The four cylinders were left in the laboratory but were treated differently as follows:

- Cylinder A : placed in wind
- Cylinder B : placed in sunlight
- Cylinder C : the leafy twig was covered in a clear plastic bag that was wet on the inside
- Cylinder D : placed in shade

After two hours, water levels in the four cylinders, A to D were recorded and the following results were obtained:

Results:

1	2	3	4
45 ml	48 ml	50 ml	55 ml

2.3.1 Name the process that causes water to be lost from the twig. (1)

2.3.2 State the aim of this investigation. (2)

2.3.3 Explain the purpose of the oil layer? (2)

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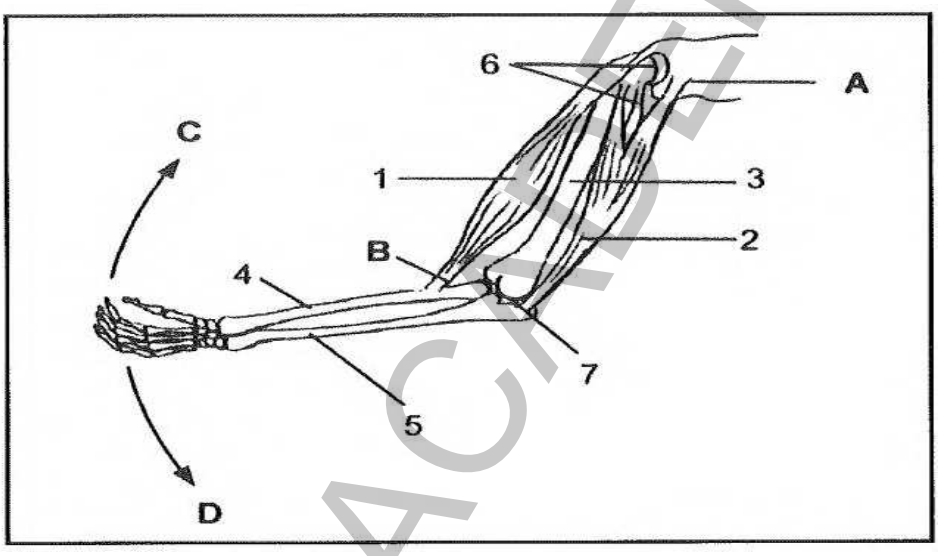
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2.3.4 Explain ONE precaution that needs to be taken when using leafy twigs, to ensure the results are valid. (2)

2.3.5 Write down the letters A to represent the measuring cylinder. Using the results in the table above, calculate the amount of water loss you would expect for each of the four cylinders. (2)

(9)

2.4 Study the accompanying diagram which shows the antagonistic muscles Of the upper arm in the human body.



2.4.1 Explain the term antagonistic muscles. (2)

2.4.2 Identify the muscles numbered:

(a) 1 (1)

(b) 2 (1)

2.4.3 When the hand is lifted in the direction of C, which muscle (1 or 2) will be:

(a) The extensor (1)

(b) The flexor (1)

2.4.4 Identify the bones labelled:

(a) Number 3 (1)

(b) Number 4 (1)

(c) Number 5 (1)

2.4.5 Name two parts of the skeleton. (2)

(11)

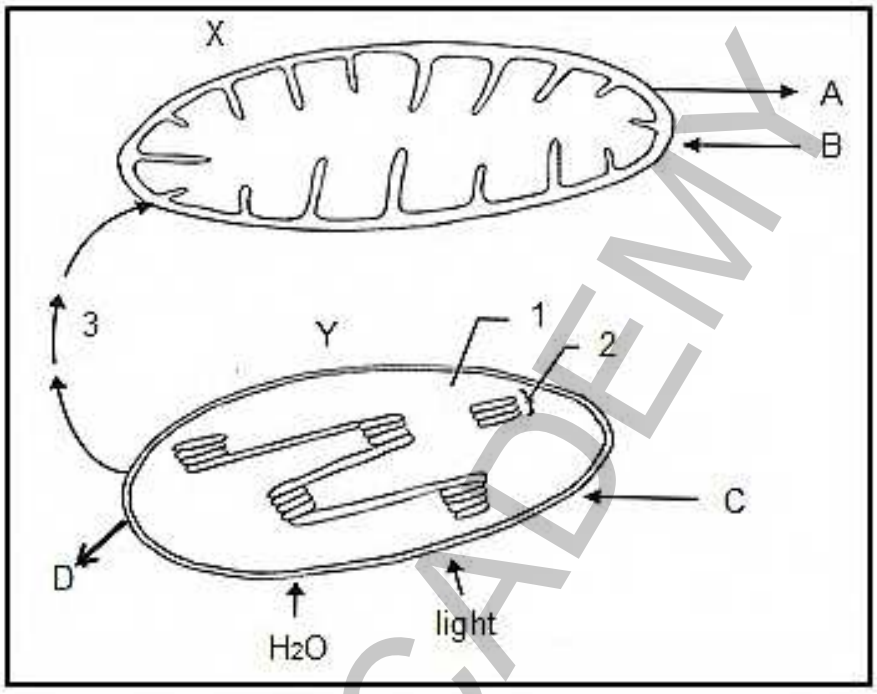
TOTAL QUESTION 2: [50]

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QUESTION 3

3.1 Study the diagram below and answer the questions that follow:



3.1.1 Identify the cell organelles X and Y (2)

3.1.2 Which metabolic process is associated with:
(a) X
(b) Y (2)

3.1.3 Each organelle has a network of membranes.
Describe the molecular structure of one of these membranes (3)

3.1.4 Identify the parts numbered 1 and 2. (2)

3.1.5 Identify the gases A, B, C and D respectively. (4)

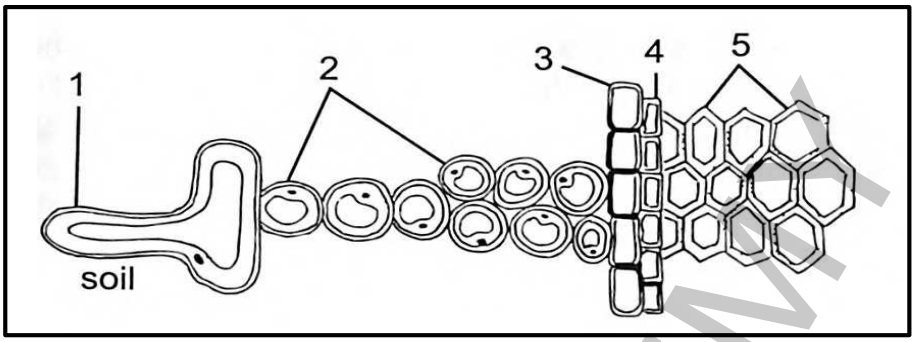
3.1.6 State the three structural suitability of organelle X. (3)

(16)

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3.2 The following diagram represents part of a cross section through an angiosperm root.



3.2.1 Describe how water enters the structure numbered 1 from the soil. (6)

3.2.2 Write down the NUMBERS and NAMES of the tissue through which water passes, until it reaches the xylem. (4)

3.2.3 Name the force which develops in the root and is believed to push water up the stem. (1)

3.2.4 State TWO ways in which structure **numbered 5** is suited for its function. (2)

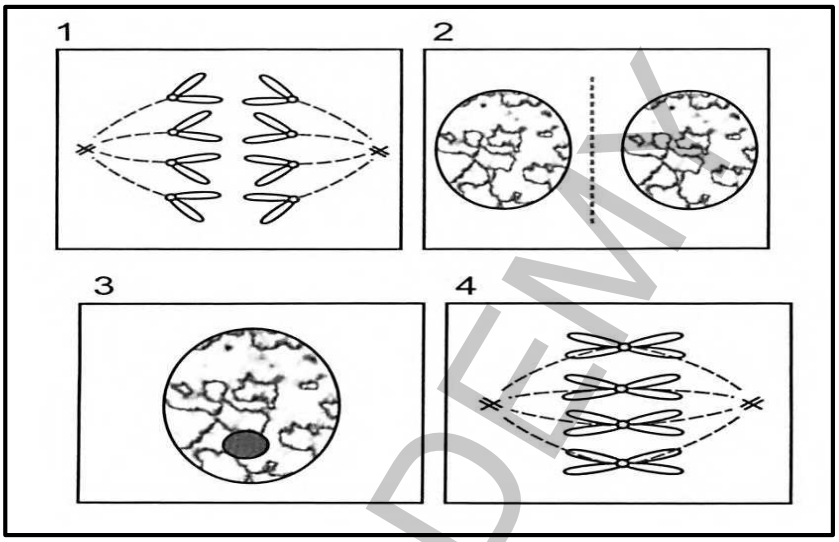
3.2.5 Name the two processes by which water moves from the epidermis through to the middle of the root. (2)
(15)

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3.3 The diagrams below show four stages of a cell undergoing Mitosis.

Study the diagrams and answer the questions that follow:



3.3.1 Give the NUMBERS of the diagrams in the correct order in which they occur in this process. (2)

3.3.2 (a) Name the stage of mitosis visible in DIAGRAM 2. (1)
(b) Explain what occurs in this stage. (3)

3.3.3 How many chromosomes will be present in each of the daughter cells shown above after the process is complete? (1)

3.3.4 Give THREE reasons why mitosis is biologically important (6)

(13)

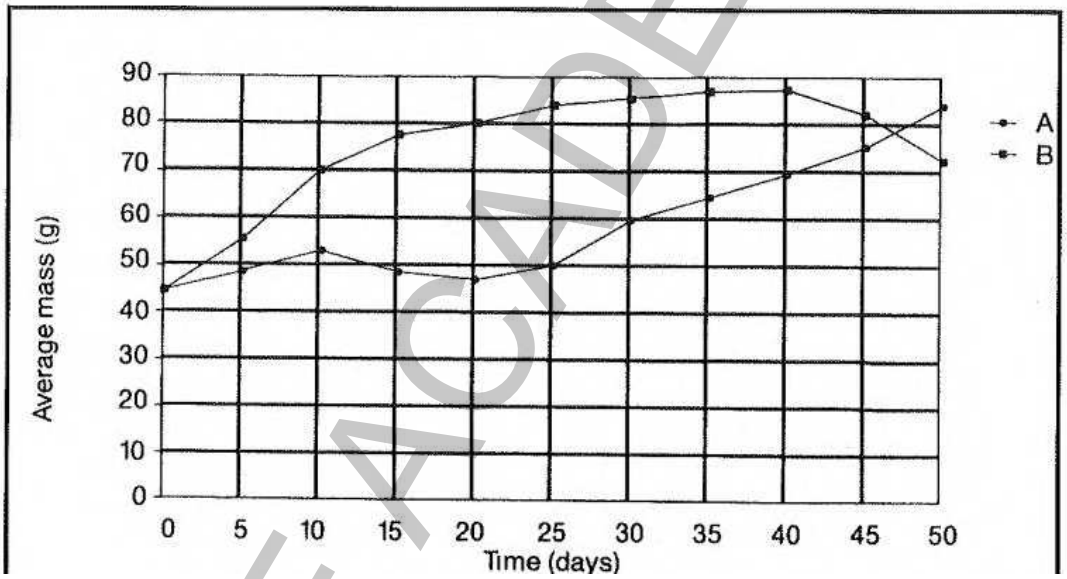
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3.4.1 In an investigation to determine the influence of milk on the growth of mice, Mice of the same litter and with the same average mass, were divided into Two groups A and B. They were fed on the following diets for a 50 day Period.

Group	Day 0 to day 20	Day 20 to day 50
A	Proteins,glucose,starch,fats, mineral salts and water	Proteins,glucose,starch,fats, mineral salts and water plus 3cm^3 milk per day
B	Proteins,glucose,starch,fats, mineral salts and water plus 3cm^3 milk per day	Proteins,glucose,starch,fats, mineral salts and water

The results of this investigation can graphically be represented as follows:



3.4.1 Name TWO ways in how the scientist ensured the validity of the Investigation. (2)

3.4.2 What conclusion can you draw from the results of the experiment? (2)

3.4.3 Give the dependent variable in this investigation and how it was measured (2)

(6)

TOTAL QUESTION 3: [50]

TOTAL SECTION B: 100

GRAND TOTAL: [150]

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