LIMPOPO

PROVINCIAL GOVERNMENT

REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF

EDUCATION

NATIONAL

SENIOR CERTIFICATE



GRADE 11



LIFE SCIENCES

JUNE EXAMINATION 2023

MARKS: 150

TIME: 2 ½ hours

This question paper consists of 15 pages.

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 the question paper.
5. Present your answers according to the instructions of each question.
6. Do ALL drawings in pencil and labels should be in black and blue 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 must use a non-programmable calculator, protractor and a compass where necessary.
11. Write neatly and eligibly

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SECTION A

QUESTION 1

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

1.1.1 Which of the following is present in the Bryophytes?

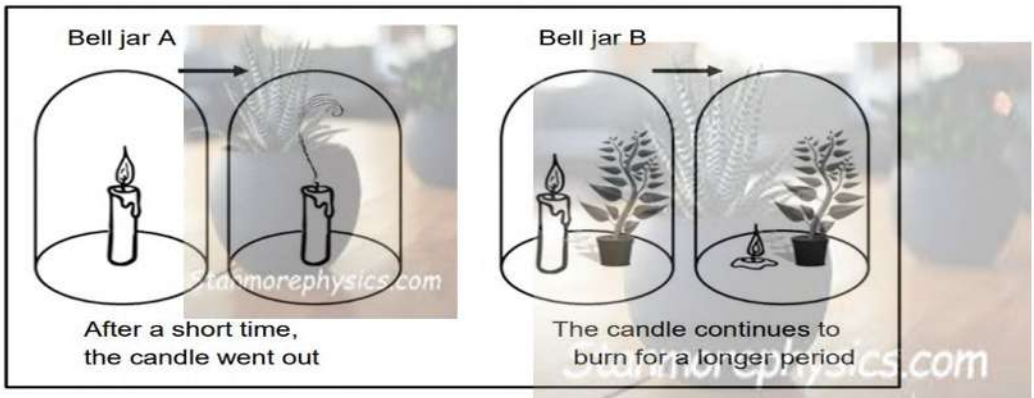
A Xylem

B Spores

C Seeds

D Flowers

1.1.2 An experiment was set up to investigate whether oxygen is released during photosynthesis. The result of the experiment is represented in the following diagram.



The following deductions were made before arriving at the conclusion.

(i) Photosynthesis reduces the amount of CO_2 inside bell jar B

(ii) The oxygen in bell jar A was completely used up and combustion is not supported

(iii) Photosynthesis increases the amount of oxygen inside bell jar B

(iv) The smoke produced inside bell jar A is due to the extinguished burning candle

Which one of the following sets of deductions is correct?

A (i) and (iv) only

B (i), (ii) and (iii) only

C (i), (iii) and (iv) only

D (iii) and (iv) only

1.1.3 Study the list below:

(i) Offspring are genetically identical to the parent
(ii) Offspring are genetically different from each other
(iii) Only one individual is required for reproduction
(iv) Increases chance of survival

Which of the above statements represent an advantage of asexual reproduction?

A (i) and (ii)

B (i) and (iii)

C (i) and (iv)

D (i), (iii) and (iv)

QUESTION 1.1.4 AND 1.1.5 ARE BASED ON THE FOLLOWING

An investigation was carried out to test the effectiveness of four antifungal treatments on preventing the growth of yeast. The results are shown in the diagram below.



1.1.4 Which of the following represents the dependent variable of the investigation?

A Yeast growth

B No yeast growth

C Antifungal treatments

D Fungisan

1.1.5 Which ONE of the following conclusions can be made from the results?

A All the antifungal treatments are equally effective

B All the antifungal treatments are ineffective

C Fungisan is the most effective and Mycocide is the least effective

D Mycocide is the most effective and Fungisan is the least effective

1.1.6 Which ONE of the following factors will cause optimal growth in greenhouses?

A Dim lighting in the greenhouse
B Temperatures between 10 °C AND 15 °C
C Carbon dioxide enrichment
D Only irrigating once a week

1.1.7 Which of the following can be absorbed by blood without further digestion?

A Fats
B Glucose
C Proteins
D Starch

1.1.8 Plants absorb oxygen…

A continuously.
B during the day only.
C during the night only.
D during photosynthesis only.

1.1.9 The conversion of pyruvic acid into lactic acid occurs during…

A photolysis.
B glycolysis.
C anaerobic respiration.
D aerobic respiration.

(9x2) **(18)**

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 1.2.10) in your ANSWER BOOK.

1.2.1 The collective name for a stigma, style and ovary

1.2.2 Chewed food mixed with saliva formed in preparation for swallowing

1.2.3 The germ layer that gives rise to muscle and other internal organs

1.2.4 The stage of cellular respiration in which glucose is converted to pyruvic acid

1.2.5 Folded structures found on the inner membrane of the mitochondria

1.2.6 Type of symmetry in which an animal can be cut in one central longitudinal plane to give two mirror images

1.2.7 The differentiation of the anterior end of an animal into a definite head.

1.2.8 The micro-organism used in the manufacturing of beer and bread

1.2.9 An organism responsible for transmitting a disease

1.2.10 An automatic wave of muscle contraction and relaxation that moves food in one direction through the digestive tract

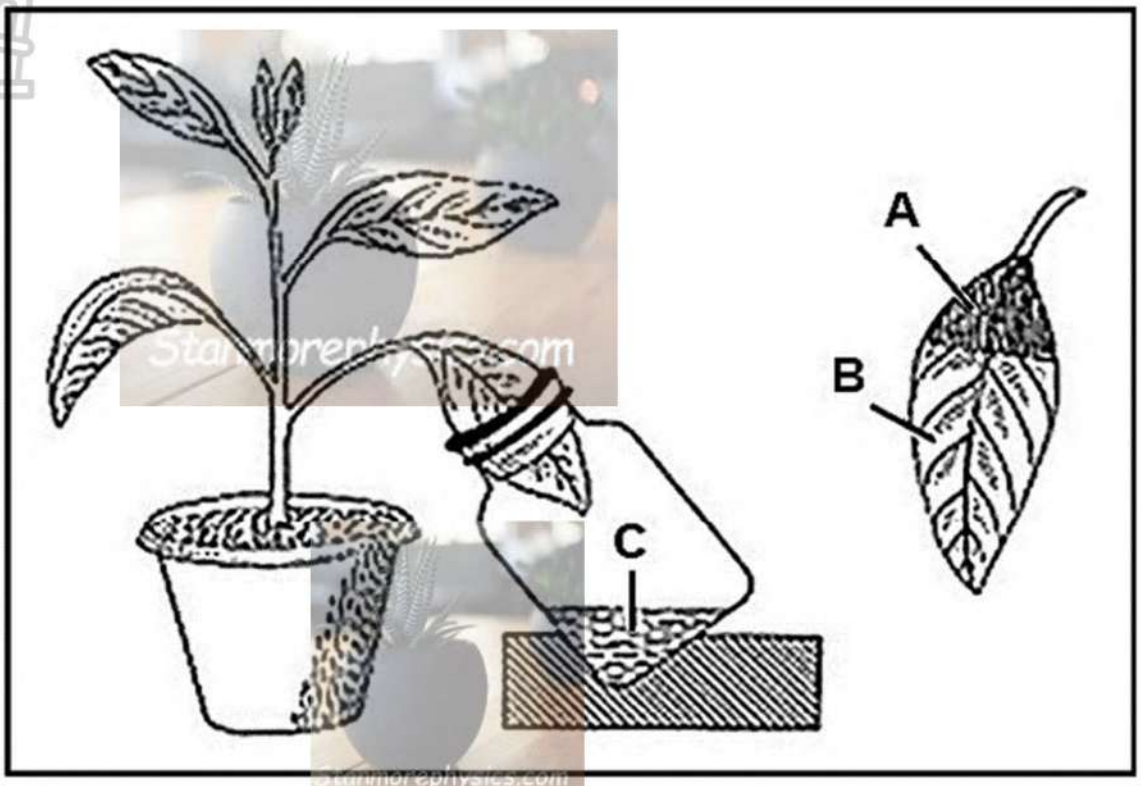
(10 x 1) **(10)**

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	**COLUMN II**
1.3.1 Characterized by jointed appendages and an exoskeleton	A: Chordata B: Arthropoda
1.3.2 The structure that prevents the passage of food particles in the lungs	A: Glottis B: Epiglottis
1.3.3 Site for cellular respiration	A: Chloroplast B: Ribosome
1.3.4 Gas released and not used during photosynthesis	A: Oxygen B: Carbon dioxide

(4x2) **(8)**

1.4 The diagram below shows the set-up of an experiment to investigate whether carbon dioxide is necessary for photosynthesis to take place. The plant was de-starched before the apparatus was set up as in the diagram and placed in a sunny room.



1.4.1 Name liquid **C**. (1)

1.4.2 Give the function of liquid **C.** (1)

1.4.3 What result can be seen at **B**? (1)

1.4.4 Explain ONE reason for the result at **A.** (2)

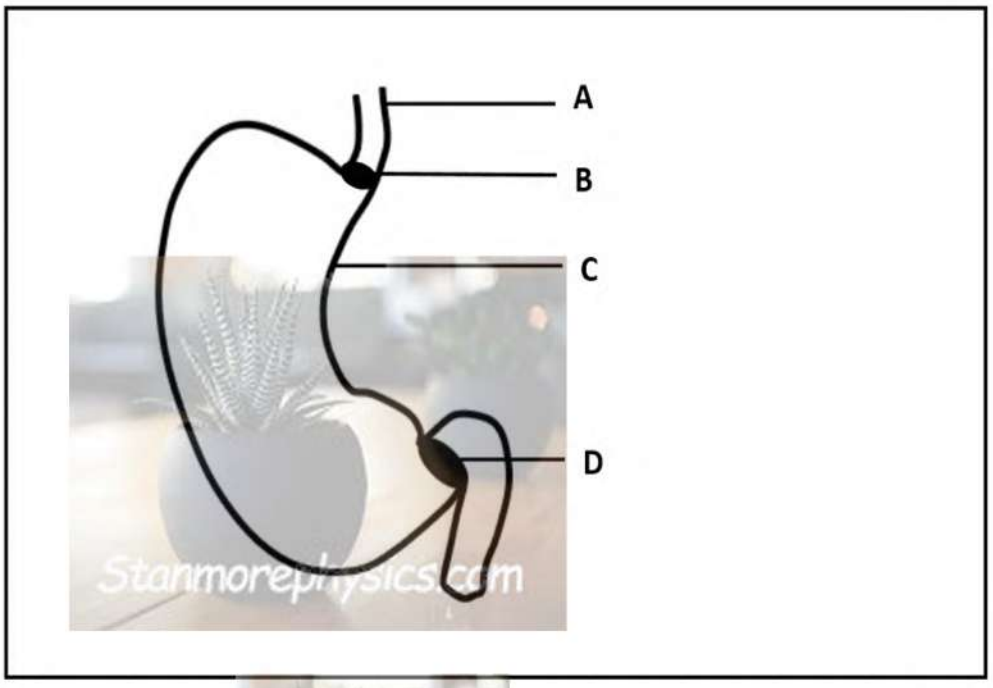
1.4.5 In which phase of photosynthesis will carbon dioxide be used? (1)

1.4.6 Where in the chloroplast will the phase named in QUESTION 1.4.5 take place? (1)

1.4.7 Why was the plant destarched before the experiment was conducted? (1)

(8)

1.5 The diagram below represents a part of the human digestive system.



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

1.5.2 Name the organic compound that is chemically digested in part **C.** (1)

1.5.3 Which enzyme is responsible for digesting the compound mentioned in QUESTION 1.5.2 above? (1)

(6)

TOTAL SECTION A: 50

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SECTION B

QUESTION 2

2.1 Grade 11 learners wanted to investigate the growth of bacteria on culture plates. The culture plates contained different nutrients as shown in the table below.

Culture plate number	Nutrient A	Nutrient B	Nutrient C
1	✓	✓	
2	✓	✓	✓
3	✓		✓
4		✓	✓

They used a sterile needle to place the bacteria on each plate. After a few days they counted the number of colonies on each culture plate. The results are shown in the table below.

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Culture plate number	Number of bacterial colonies
1	10
2	50
3	9
4	2

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2.1.1 Formulate a hypothesis for the investigation. (3)

2.1.2 Identify the dependent variable for this investigation. (1)

2.1.3 In which plate were the most colonies found? (1)

2.1.4 Suggest a reason why most colonies were found in the plate mentioned in your answer in QUESTION 2.1.4. (1)

2.1.5 According to these results, which is the most important nutrient for bacterial growth? (1)

2.1.6 Mention TWO factors that learners should keep constant during the investigation. (2)

2.1.7 State TWO ways in which the learners could increase the reliability of the investigation. (2)

2.1.8 Draw a bar-graph to show the learners' results. (6)

(17)

2.2 Read the passage below and answer the questions that follow.

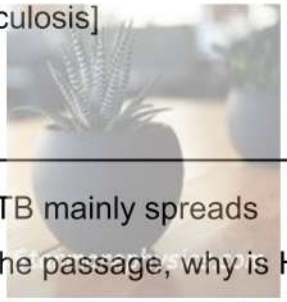
SOUTH AFRICA PERSPECTIVE: TUBERCULOSIS

Tuberculosis (TB) is caused by the bacterium Mycobacterium tuberculosis and is a serious public health issue in South Africa. About 450, 000 people develop the disease every year, and 270 000 of those are also living with HIV. TB is South Africa's leading cause of death. About 89 000 people die from it every year that's ten people every hour.

HIV infection is a key factor in the TB epidemic. HIV sufferers have a higher risk of contracting TB and a greater chance of dying as they have a weaker immune system.

A vaccine, called BCG (Bacilli Calmette-Guerin) is used to prevent TB. It is more effective in children and its efficacy in adults is inconsistent

[Adapted from https://www.copenhagen consensus.com-South Africa Perspective: Tuberculosis]



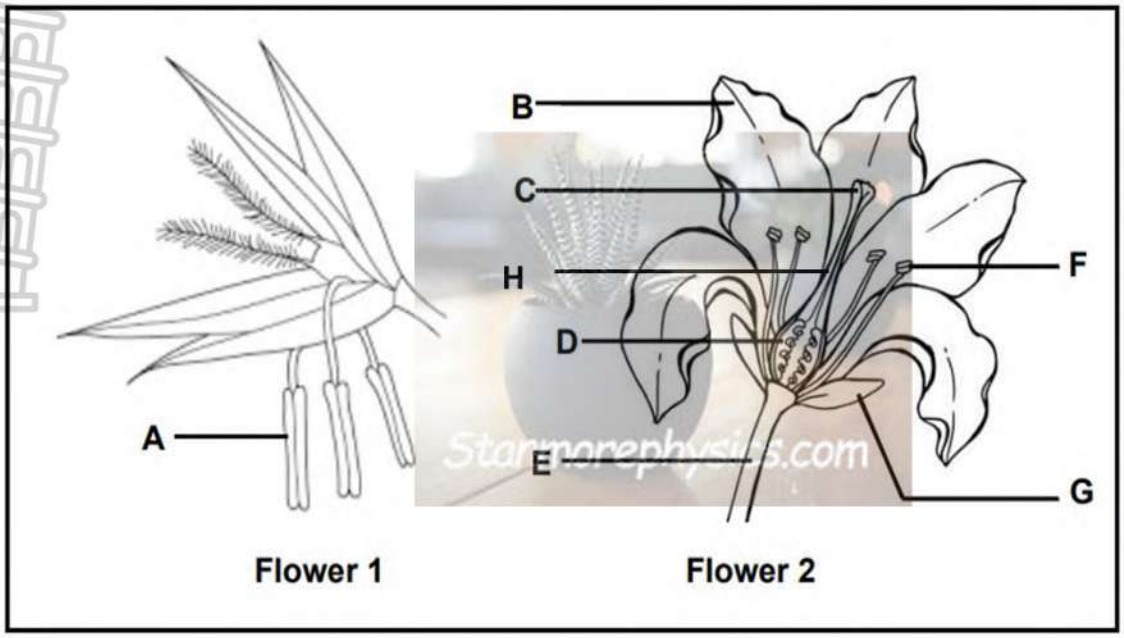
2.2.1 Explain how TB mainly spreads (3)

2.2.2 As stated in the passage, why is HIV infection linked to TB? (2)

2.2.3 Explain how the BCG would give immunity (3)

(8)

2.3 Study the diagrams of the two flowers below.



2.3.1 Supply labels for:

(a) Structure **A** (1)

(b) Whorl **G** (1)

(c) Structure **E** (1)

2.3.2 Give the collective names for:

(a) Whorl **B** and **G** (1)

(b) Structure **C, D** and **H** (1)

2.3.3 Give TWO functions of flowers. (2)

2.3.4 Which **Flower (1** or **2)** is probably pollinated by insects? (1)

2.3.5 Tabulate THREE differences between wind pollinated flowers and Insect pollinated flowers. (7)

(15)

2.4 The fertilized ovule of a flower forms a seed.

2.4.1 Explain TWO ways in which seeds are significant for plant survival (4)

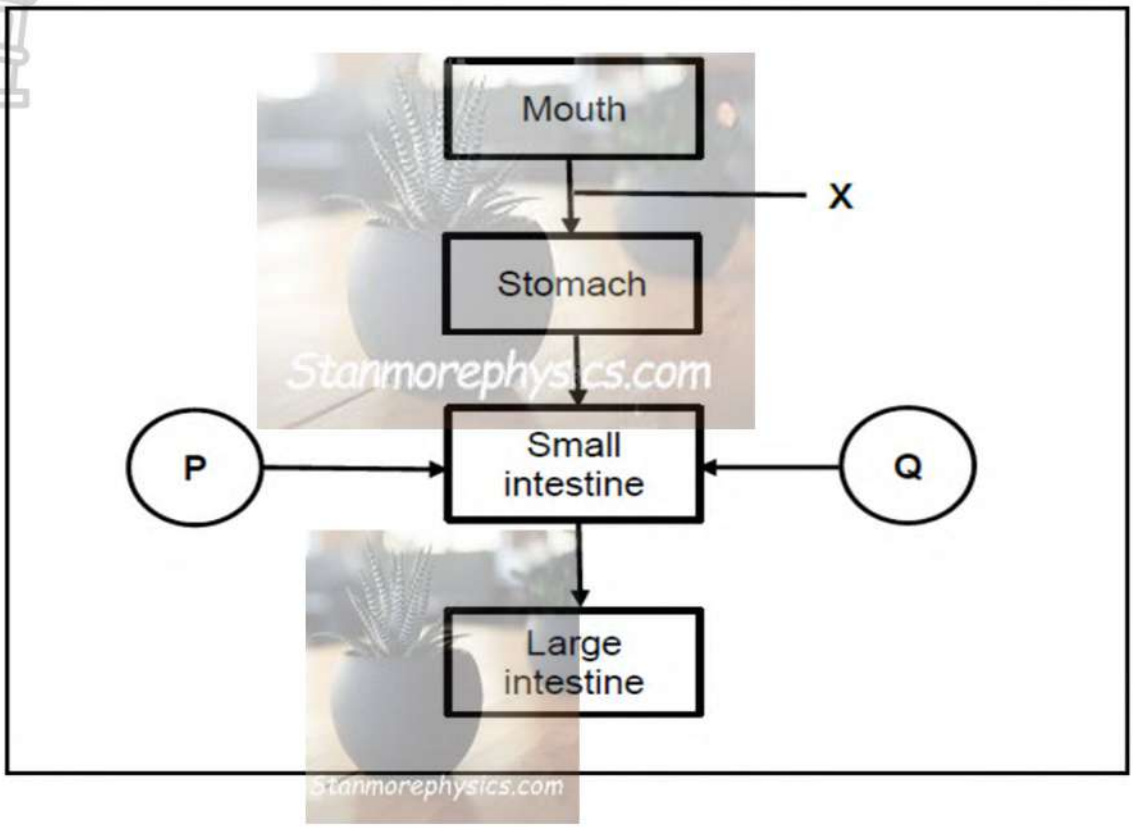
2.4.2 Explain a significance of seeds for the human population (2)

(6)

[46]

QUESTION 3

3.1 The diagram below shows a diagrammatic representation of the digestive system.



3.1.1 What part of the alimentary canal is represented by **X**? (1)

3.1.2 Name and describe the process that moves food along structure **X**? (3)

3.1.3 Name the product that the bladder-like organ P stores until it is released into the duodenum of the small intestine. (1)

3.1.4 Give TWO functions of the secretion mentioned in QUESTION 3.1.3 (2)

3.1.4 Explain why the pancreas is regarded as both an endocrine and an exocrine gland. (4)

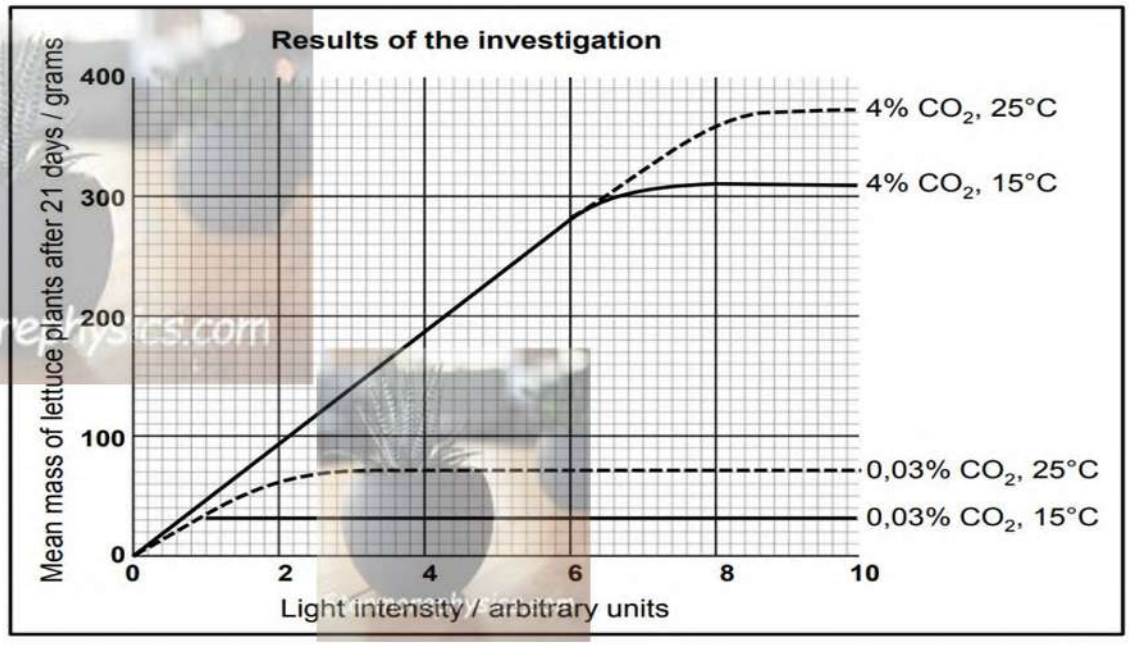
3.1.5 Draw a labelled diagram of the structures abundant in the small intestine responsible for absorption of digested molecules. (5)

(16)

3.2 Scientists set up an apparatus to investigate the effect of temperature, light intensity and carbon dioxide concentrations on plant growth. Using this apparatus, they could control each factor.

- The scientists set different temperatures, CO2 concentrations and light intensity for four different groups of lettuce plants.
- The average mass of lettuce plants serves as an indication of the rate of photosynthesis.

Study the results below and answer the questions that follow.



3.2.1 What is the influence of light intensity on average mass of lettuce plants? (2)

3.2.2 What is the mean mass of lettuce plants when the rate of photosynthesis is at maximum? (1)

3.2.3 Name TWO limiting factors that influence the rate of photosynthesis as the light intensity increases. (2)

3.2.4 How were the scientists able to increase the rate of photosynthesis to the maximum level? (2)

3.2.5 What would happen to the rate of photosynthesis if the temperature is raised beyond 35°C? Give a reason for your answer (2)

3.2.6 Discuss the biological importance of photosynthesis (4)

(13)

3.3 Read the following passage and then answer the questions.

Cellular respiration

Adenosine triphosphate (ATP) is the immediate source of energy used by muscles. When glucose is broken down during cellular respiration to release energy, this energy is transferred to ATP molecules.

The first step in the breakdown of glucose molecules takes place in the absence of oxygen. This is known as the anaerobic phase. One of the substances produced here is lactic acid which accumulates in the muscle cells.

If plenty of oxygen is available, then aerobic respiration takes place. This results in the formation of carbon dioxide and water instead of lactic acid.

3.3.1 In which part(s) of the cell do steps to cellular respiration normally occur? (2)

3.3.2 Name:

(a) The organic compound needed for cellular respiration (1)

(b) TWO products of aerobic respiration (2)

(c) The intermediate molecule into which glucose is broken down (1)

3.3.3 Give ONE difference between aerobic respiration and anaerobic respiration, as suggested by the passage. (2)

3.3.4 Anaerobic respiration also occurs in plants. What by-product is produced in plant tissue? Name ONE. (1)

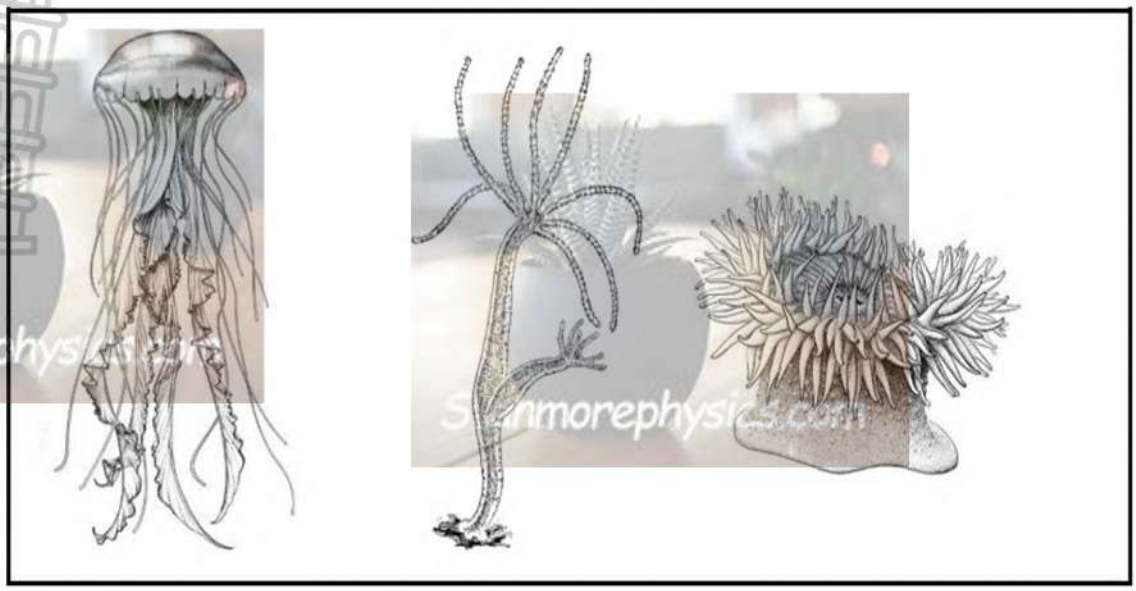
3.3.5 Anaerobic respiration is used in the process of fermentation.

(a) Name ONE food or beverage product which makes use of the fermentation process in its manufacture. (1)

(b) Explain how the production of foods and beverages made by fermentation benefit the South African economy. (2)

(12)

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



3.4.1	Name the kingdom to which the above organisms belong.	(1)
3.4.2	Name the phylum to which the above phylum belongs.	(1)
3.4.3	Name the kind of symmetry shown by these animals	(1)
3.4.4	Draw a simple labelled diagram to demonstrate a cross section through the body wall of tissue layers found in this phylum	(4)
3.4.5	Invertebrates such as earthworms play a vital role in agriculture and ecosystems.	
	(a) Distinguish between a vertebrate and an invertebrate.	(2)
	(b) Explain how invertebrates are of importance in farming.	(4)
		(13)
		[54]

TOTAL SECTION B: 100

GRAND TOTAL: 150

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