**KWAZULU-NATAL PROVINCE**

**EDUCATION**
REPUBLIC OF SOUTH AFRICA

# PROVINCIAL STANDARDISED ASSESSMENT

## GRADE 11

## LIFE SCIENCES

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## JUNE 2026




**MARKS: 150**

**TIME: 2½ hours**

**N.B. This question paper consists of 16 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 answer and write only the letter (A - D) next to the question number (1.1.1 to 1.1.10) in the ANSWER BOOK, e.g. 1.1.11 D.

1.1.1 Long and sharp teeth in carnivores used for tearing and gripping tough food are the …

A molars.
B premolars.
C canines.
D incisors.




1.1.2 Primary function of the lacteal in the villus of the small intestine is to absorb …

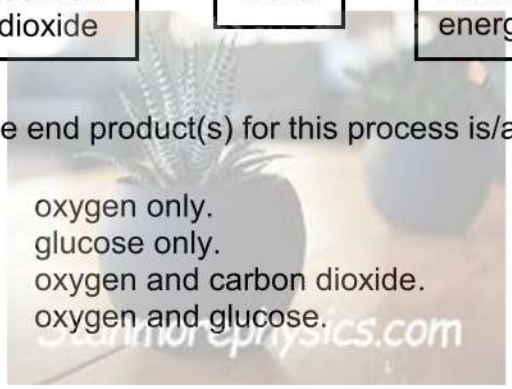
A fats and fat – soluble vitamins.
B glucose.
C amino acids.
D starch.

1.1.3 The process of photosynthesis can be represented by the equation.




The end product(s) for this process is/are …

A oxygen only.
B glucose only.
C oxygen and carbon dioxide.
D oxygen and glucose.




1.1.4 Which ONE of the following statements is the function of chlorophyll in autotrophic bacteria?

A Convert carbohydrates to carbon dioxide
B Traps radiant energy from the sun
C Acts as catalyst during photosynthesis
D Converts chemical energy from the sun to light energy

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1.1.5 When the glucose levels in the blood decrease below the normal level. The pancreas is stimulated to secrete …

A glucagon via blood to the liver.
B glycogen to the blood.
C insulin via blood to the liver.
D glucose to the blood.

1.1.6 Which ONE of the following represents the CORRECT pathway of food in the alimentary canal?

A Ingestion → digestion → assimilation→ absorption → egestion
B Digestion → absorption → assimilation → ingestion → egestion
C Ingestion → digestion → absorption → assimilation → egestion
D Egestion → digestion → absorption → assimilation → ingestion

**QUESTIONS 1.1.7 AND 1.1.8 REFER TO THE DIAGRAM BELOW THAT REPRESENTS A FACTOR THAT INFLUENCES THE RATE OF PHOTOSYNTHESIS**




1.1.7 The correct caption for the line graph above:

A The rate of photosynthesis on different carbon dioxide level
B The effect of the rate of photosynthesis on different temperatures
C The effect of different temperatures on the rate of photosynthesis
D Different carbon dioxide level on the rate of photosynthesis

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1.1.8 Which ONE of the following CORRECTLY explains the influence of the independent variable on enzyme activity?

| | | |
|---|---|---|
| A | **25** to **30** is an optimum level | Enzymes are more active |
| B | **10** to **20** is a low level | Enzymes are denatured |
| C | **30** to **40** is an optimum level | Enzymes are less active |
| D | **40** to **50** is a high level | Enzymes are more active |

1.1.9 The following is a list of diseases caused by different microorganisms:

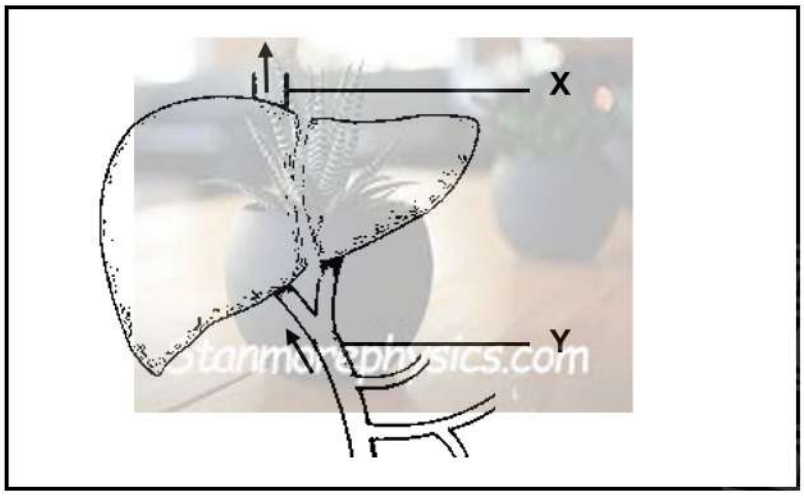
(i) Malaria
(ii) Influenza
(iii) Tuberculosis
(iv) Rabies

Which ONE of the following combinations are diseases caused by an acellular, non-living, parasitic microorganism?

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

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1.1.10 The diagram below represents the organ involved in hepatic portal system.




Which ONE of the following is CORRECT of part labelled **Y** and it's function?

A Hepatic vein, transports remaining glucose to the liver.
B Hepatic portal vein, transports the absorbed nutrients to the liver.
C Hepatic vein, transport glucose to the heart and rest of the body.
D Hepatic portal vein, transports the absorbed nutrients to the heart.

(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 to 1.2.9) in the ANSWER BOOK.

1.2.1 Grouping of organisms according to their shared characteristics.

1.2.2 Symbiotic relationship between two organisms where one benefit while the other neither benefits nor is it harmed.

1.2.3 Administration of a weakened form of pathogen to stimulate the immune system to fight pathogens and build immunity.

1.2.4 Micro-organism that reproduces only inside the host and causes illness.

1.2.5 Parasitic protozoa that cause malaria in human.

1.2.6 Type of immunity that develops through exposure to disease causing microorganism.

1.2.7 Metabolic process where absorbed nutrients are carried through the bloodstream to cells and converted into complex molecules for energy.

1.2.8 A branching diagram which shows the evolutionary relationships through different organisms.

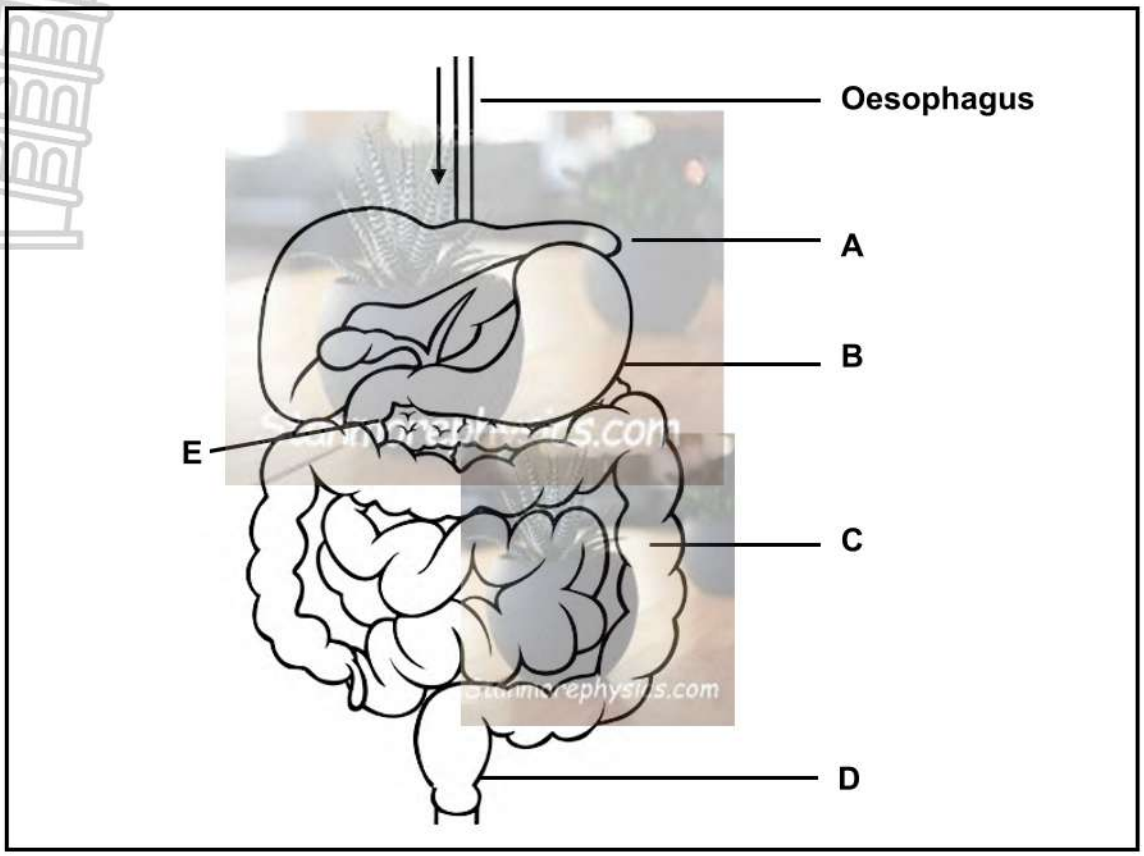
1.2.9 Maintenance of a constant internal environment within narrow limits regardless of changes externally. (9 x 1) **(9)**

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 (1.3.1 to 1.3.3) in the ANSWER BOOK.

| | COLUMN I | COLUMN II |
|---|---|---|
| 1.3.1 | A lack of cellular structure in an organism | A: Acellular<br>B: Unicellular |
| 1.3.2 | Location of small, finger-like projections called villi | A: Large intestine<br>B: Small intestine |
| 1.3.3 | Role of fungi in industry | A: Beer making<br>B: Bread making |

(3 x 2) **(6)**

1.4 The diagram below shows a section of the human alimentary canal.




1.4.1 Identify part:

(a) **C** (1)

(b) **D** (1)

1.4.2 Give the LETTER and NAME of the organ that:

(a) produces and contains hydrochloric acid. (2)

(b) convert excess glucose into glycogen for storage. (2)

1.4.3 Name the:

(a) TWO exocrine glands that release their secretions to Part **E** during digestion. (2)

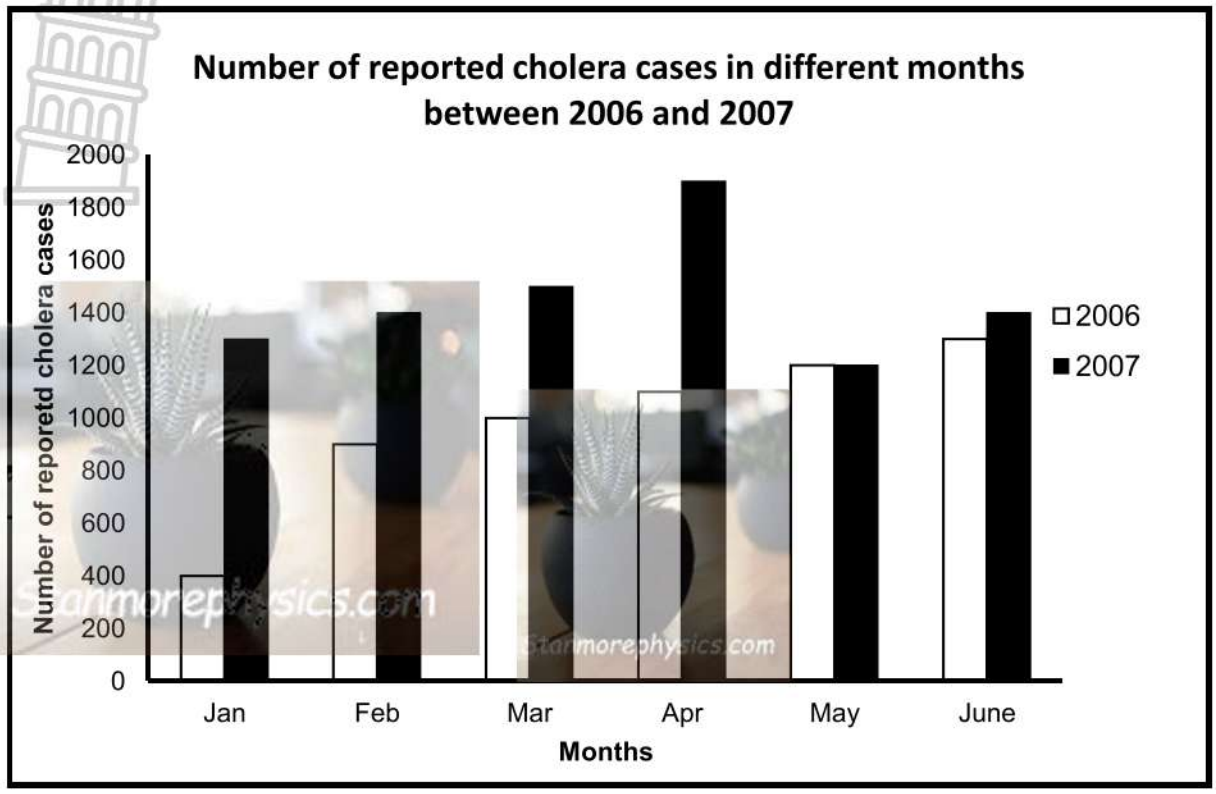
(b) type of digestion that take place in part **B** which is caused by muscular contraction (churning). (1)

1.4.4 Name the muscular movement that allows food to move down the oesophagus (shown by the arrow in the diagram above). (1)

**(10)**

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1.5 The bar graph below shows the number of cholera cases reported in KwaZulu-Natal between 2006 and 2007.




1.5.1 Name the microorganism that causes cholera. (1)

1.5.2 State the kingdom to which the microorganism mentioned in QUESTION 1.5.1 belongs. (1)

1.5.3 How many cases of cholera were reported in the month of Jan 2006? (1)

1.5.4 Which month(s) is the number of reported cholera cases:

(a) the same between 2006 and 2007? (1)

(b) the highest in 2007? (1)

**(5)**

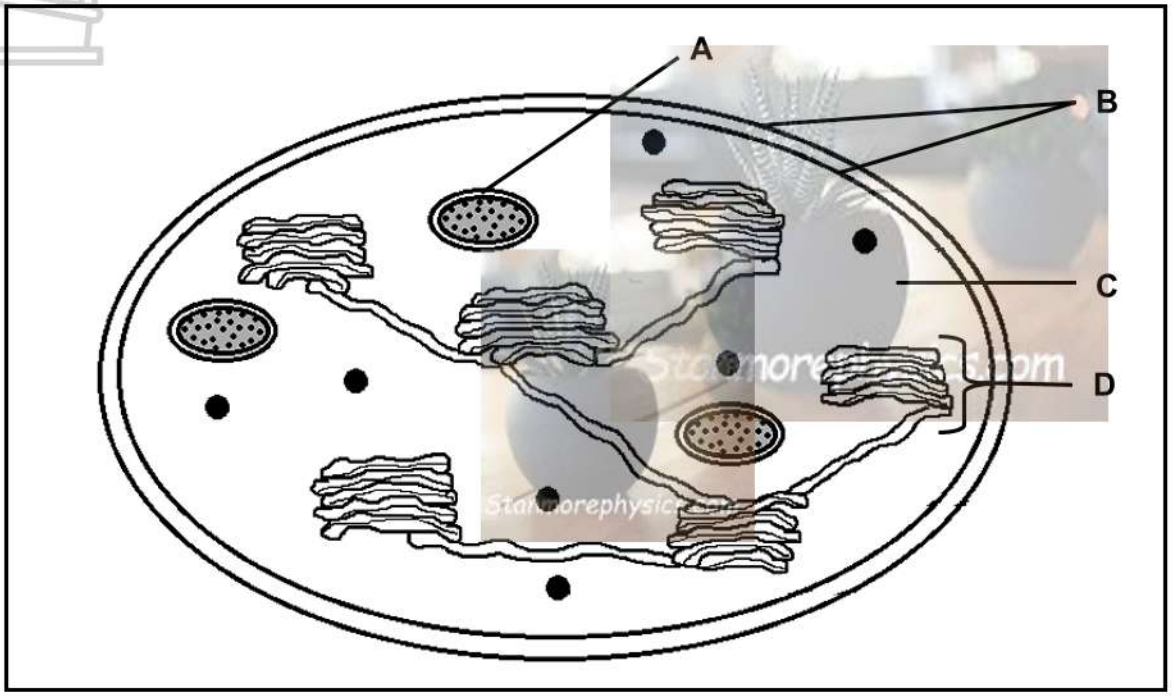
**TOTAL SECTION A: 50**

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## SECTION B

## QUESTION 2

2.1 The diagram below shows the structure of the chloroplast.




2.1.1 Name the biological process that take place in the above organelle. (1)

2.1.2 Give the LETTER and NAME of the part that contains:

(a) a form of glucose that is produced in the chloroplast. (2)

(b) green pigments that trap sunlight to make glucose. (2)

2.1.3 TWO stages of an important biological process take place within this organelle. Describe the stage that occurs in part labelled **C**. (5)

2.1.4 Predict what will happen to the biological process that occurs within this organelle if part **B** becomes impermeable to substances. (3)

**(13)**

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2.2 Read the passage below.

**WHAT IS $CO_2$ ENRICHMENT?**

$CO_2$ enrichment is the process of increasing the amount of carbon dioxide to a level higher that what is normally in fresh air.

Higher levels of $CO_2$ than normal in air can be caused by human or animal respiration in an enclosed area and by natural off-gassing of $CO_2$ from the ground. What makes $CO_2$ enrichment unique is that it is purposely done by indoor growers or in greenhouses to increase plant growth, flowering and to speed the time to harvest.



2.2.1 What is *carbon dioxide enrichment*? (1)

2.2.2 From the extract, state TWO:

(a) factors that cause higher levels of carbon dioxide. (2)

(b) purposes of carbon dioxide enrichments. (2)

2.2.3 Describe the importance of carbon dioxide enrichment in ensuring sustainable food supply which improves food security. (2)



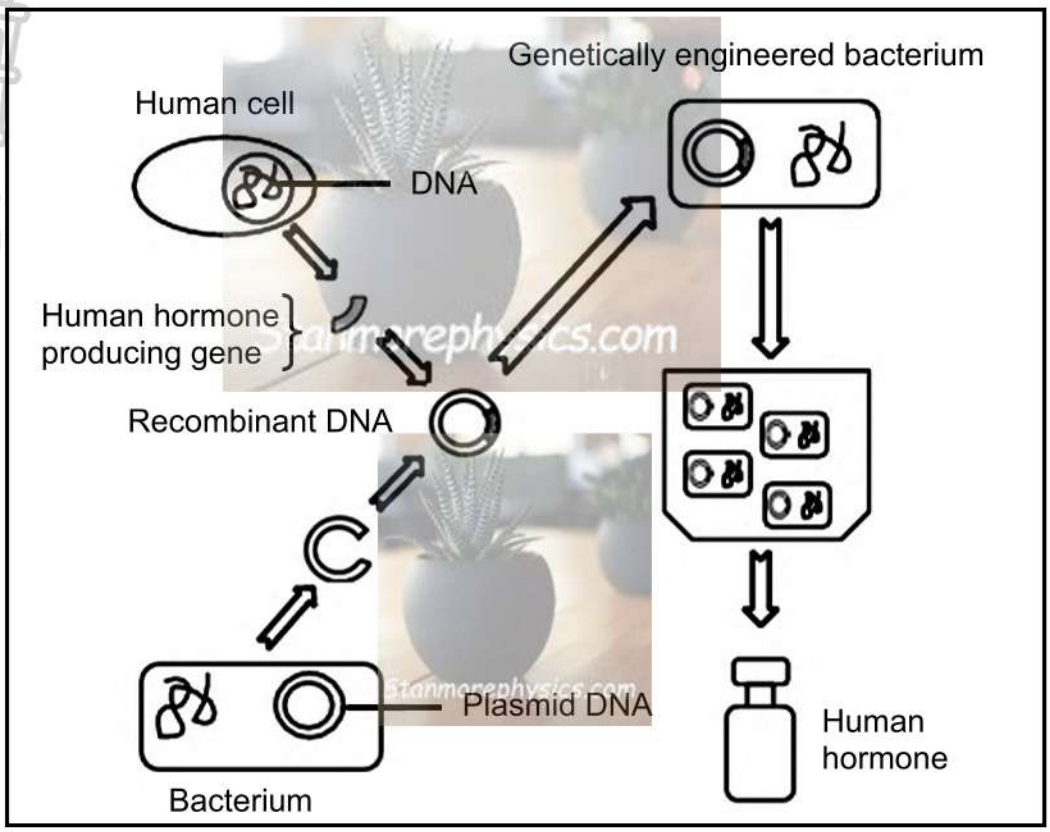

2.2.4 Greenhouses use ultra-violet light bulbs when there is insufficient sunlight.

Describe the relationship between light intensity and the photosynthetic rate of plants. (2)

**(9)**

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2.3 The flow diagram below shows the use of microorganisms to produce medicines.




2.3.1 Name the:

(a) biotechnological process that is shown above. (1)

(b) human hormone that is produced by the biotechnological process above. (1)

2.3.2 Give TWO reasons why bacteria is commonly used in the biotechnological process above. (2)

2.3.3 Describe how the hormone named in QUESTION 2.3.1 (b) is used as treatment of diabetes mellitus. (2)

**(6)**

2.4 Cellular respiration is a metabolic process in which glucose is broken down using oxygen to release stored chemical energy.

2.4.1 Draw a labelled diagram of the organelle in which cellular respiration take place. (4)

2.4.2 Describe the role of hydrogen atoms during oxidative phosphorylation. (2)

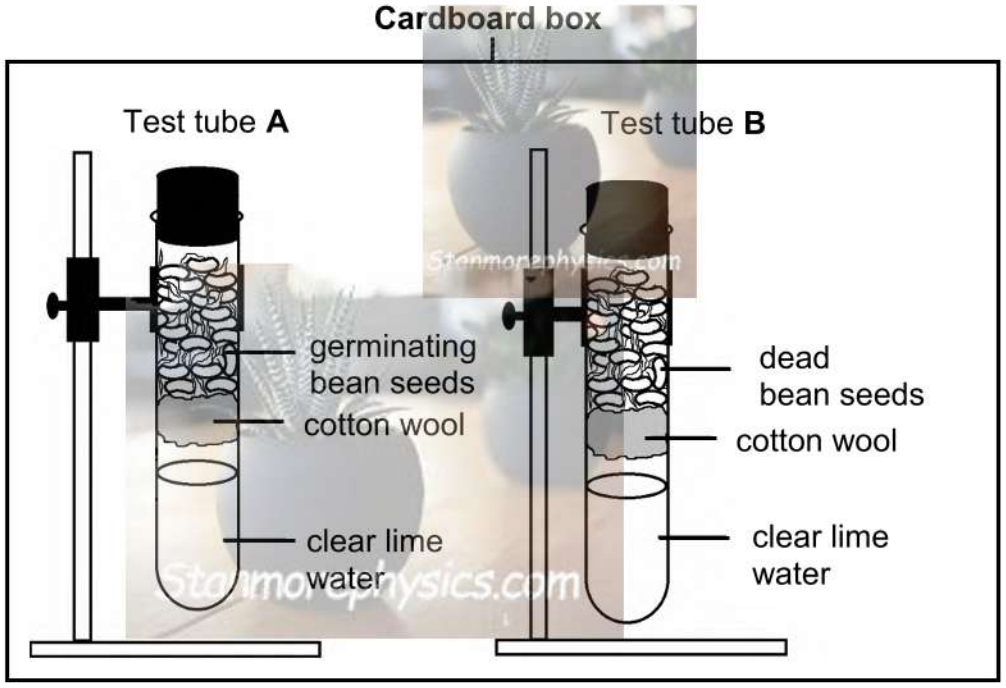
2.4.3 Tabulate TWO differences between aerobic and anaerobic respiration. (5)

**(11)**

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2.5 The diagram below shows the apparatus used to investigate respiration in living organisms. Grade 11 learners conducted an investigation using the following procedure:

- 40 bean seeds were germinated.
- Seeds were divided into two groups, 20 in each group.
- 20 germinating bean seeds were placed in Test tube **A**, 20 germinating bean seeds were boiled in hot water for 45 minutes, rinsed in alcohol and placed in Test tube **B**.
- Both sets of apparatus were sterilised to remove any micro-organisms which might have been present.
- Both sets of apparatus were placed in the cardboard box as shown in the diagram below.




2.5.1 State:

(a) the aim of this investigation. (2)

(b) why 20 bean seeds were used in each group. (2)

(c) TWO planning steps to consider in this investigation. (2)

2.5.2 Which TWO environmental factors must be kept constant during this investigation? (2)

2.5.3 Which test tube (**A** or **B**) served as a control in this investigation? (1)

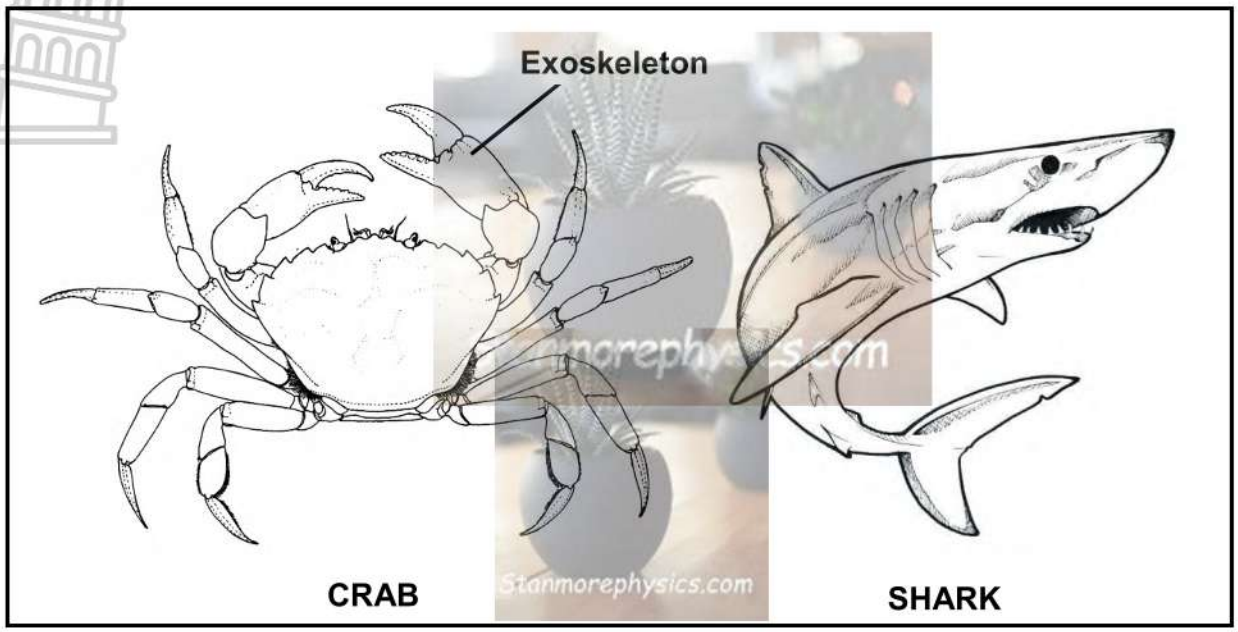
2.5.4 Explain your answer to QUESTION 2.5.3. (2)

**(11)**

**[50]**

**QUESTION 3**

3.1 The diagrams below represent aquatic organisms of different animal phyla.




3.1.1 To which phylum does the following organism belong:

(a) crab (1)

(b) shark (1)

3.1.2 Name the type of skeleton found in the species of shark. (1)

3.1.3 State ONE difference between an exoskeleton and the type of skeleton mentioned in QUESTION 3.1.2. (2)

3.1.4 Explain:

(a) how the body plan of crabs and sharks is suited to their aquatic mode of living. (2)

(b) ONE advantage of the development of coelom in the species of sharks. (2)

**(9)**

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3.2 The table below shows different invertebrates that live in the Indian Ocean near coastal areas.

| NAME OF THE PHYLUM | NAME OF THE SPECIES | NUMBER OF THE SPECIES IN THE INDIAN OCEAN (Est.) | PERCENTAGE OF EACH SPECIES |
|---|---|---|---|
| **Cnidaria** | Sea anemones | 10 157 | 26.9% |
| | Jelly-fish | 18 140 | 48.5% |
| | Medusozoan | 9 513 | 24.6% |
| | **TOTAL** | **37 810** | **100%** |
| **Porifera** | Freshwater sponges | 12 143 | 32.47% |
| | Sycon | 10 113 | **X** |
| | Cliona | 15 144 | 40.49% |
| | **TOTAL** | **37 400** | **100%** |

3.2.1 Determine the percentage value of **X**. Show ALL working. (Round off to TWO decimal places) (3)

3.2.2 List TWO evolutionary characteristics that Cnidaria and Porifera have in common. (2)

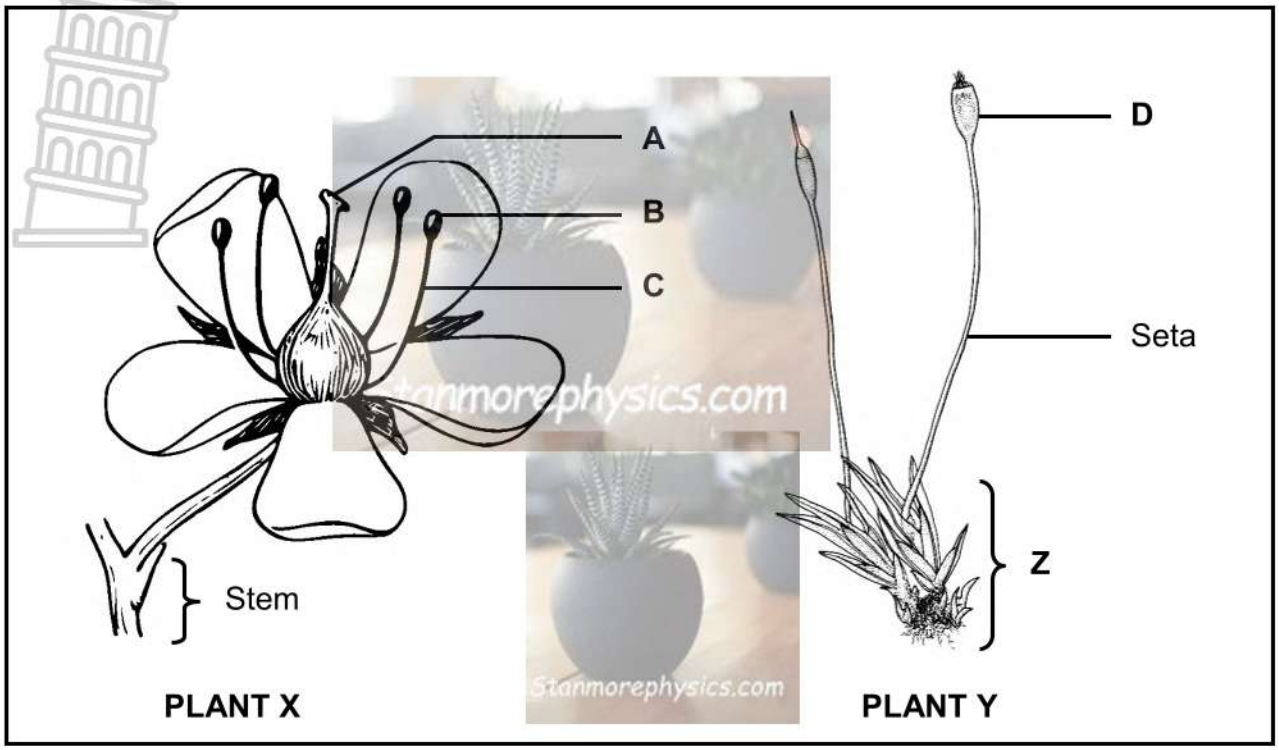
3.2.3 Cnidaria and Porifera are invertebrates. State TWO roles of invertebrates in agriculture and the ecosystem. (2)

3.2.4 Draw a pie chart using the percentages of each species in Phylum Cnidaria. Show ALL calculations. (7)

**(14)**

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3.3 The diagram below represents reproductive structures of different plant groups.




3.3.1 Identify part:

(a) **C** (1)

(b) **D** (1)

3.3.2 Give the collective name for part labelled **B** and **C**. (1)

3.3.3 Name:

(a) TWO vascular tissues that are found in the stem of plant **X**. (2)

(b) the dominant generation represented by part **Z** in plant **Y**. (1)

3.3.4 Plant **X** is considered to be the most advanced of the plant species. List TWO unique structural characteristics of the plant group **X**. (2)

3.3.5 Explain:

(a) how part **A** is structurally suited for insect pollination. (2)

(b) why pteridophytes can grow taller than plant **Y**. (2)

(c) how the dependency on water for reproduction is reduced in plant **X**. (2)

**(14)**

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3.4 Sunflowers are large-petaled flowers with vibrant yellow heads that attract a high volume of bees and other pollinators with substantial amounts of nectar and pollen.

An investigation was conducted to determine the relationship between the length of the sunflower's petals and its ability to attract high volume of pollinators.

The procedure was as follows:

- A total of 45 sunflowers were sampled and divided into 3 equal groups.
- The petals of the sunflower in each group were treated in the following way:
    - Group **1** – Left unchanged
    - Group **2** – Cut short
    - Group **3** – Made longer by adding yellow artificial pieces of petals
- The 3 groups of sunflowers were placed in the same garden with different pollinators for 7 days.
- Each day the sample of pollinators visiting the flowers was recorded as shown in the table below.

| GROUP | AVERAGE NUMBER OF VISITING POLLINATORS |
|---|---|
| 1 | 94 |
| 2 | 7 |
| 3 | 143 |

3.4.1 For this investigation, state the:

(a) Independent variable (1)

(b) Dependent variable (1)

3.4.2 Name THREE variables that were controlled during the investigation. (3)

3.4.3 State THREE characteristics of the sunflower which makes it better suited for attracting high volume of pollinators. (3)

3.4.4 Which group received more pollen grain on the stigma? (1)

3.4.5 Explain your answer to QUESTION 3.4.4. (2)

3.4.6 State a conclusion for this investigation. (2)

**(13)**

**[50]**

**TOTAL SECTION B: 100**

**GRAND TOTAL: 150**

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