

**NATIONAL
SENIOR CERTIFICATE**

GRADE 10

NOVEMBER 2018

LIFE SCIENCES P1

MARKS: 150

TIME: 2½ hours

This question paper consists of 13 pages.

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. Answer ALL the questions.
2. Write ALL the answers in your 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 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 where necessary.
11. Round off all calculations to two decimals after the comma.
12. Write neatly and legibly.

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–D) next to the question numbers (1.1.1–1.1.8) in the ANSWER BOOK, for example

1.1.10 D.

1.1.1 Glucose and fructose are examples of ...

- A proteins.
- B monosaccharides.
- C disaccharides.
- D polysaccharides.

1.1.2 The non-protein organic partners of enzymes are ...

- A catalysts.
- B co-enzymes.
- C pro-enzymes.
- D enzyme complex.

1.1.3 The process of osmosis may be described as the movement of ...

- A molecules from a region of high concentration to a region of low concentration.
- B a solvent through a differentially permeable membrane.
- C a solute through a differentially permeable membrane.
- D a solute moving from a region of high concentration to a region of low concentration.

1.1.4 The following is true of enzymes, except ...

- A enzymes are denatured at extreme temperatures.
- B enzymes are denatured at extremes of pH.
- C enzymes are used up in chemical reactions.
- D enzymes control and regulate all chemical reactions that take place in a cell.

1.1.5 The following does NOT apply to xylem vessels:

- A Long cylindrical cells
- B Perforated cross walls or completely absent
- C Thick cell walls containing lignin
- D Mature cells having a well-defined nucleus

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

- A cuticle.
- B mesophyll.
- C stoma.
- D axillary.

1.1.7 In plants with floating leaves, stomata are found ...

- A only on lower epidermis.
- B only on upper epidermis.
- C on upper and lower epidermis.
- D on neither upper nor lower epidermis.

1.1.8 Epithelium tissue lining the mouth and lungs is known as ... tissue.

- A cuboidal
- B columnar
- C ciliated columnar
- D squamous

(8 x 2) (16)

1.2 Give the correct **biological term** for each of the following descriptions. Write only the term next to the question number (1.2.1–1.2.7) in the ANSWER BOOK.

1.2.1 Plastids that contain a yellow or orange pigment

1.2.2 Cell organelle that contains digestive enzymes

1.2.3 Process of the breakdown of complex molecules in living organisms

1.2.4 Cells that form the cork cambium of stems

1.2.5 Controls inherited characteristics from parent to offspring

1.2.6 Tissue that transports organic food in a plant

1.2.7 Organic catalyst that speeds up chemical reactions

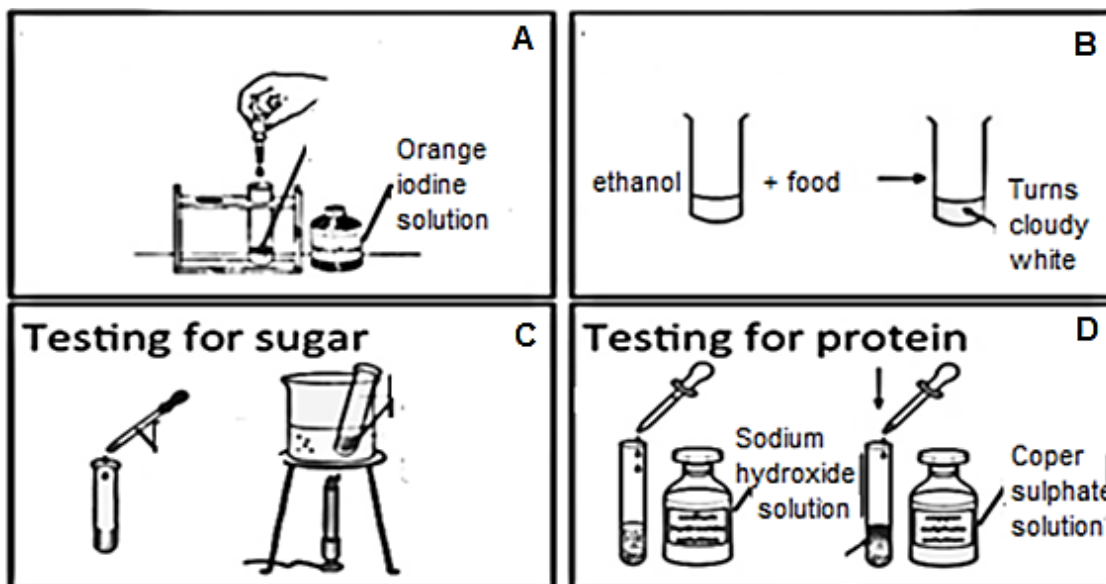
(7 x 2) (14)

1.3 Indicate whether each of the statements in COLUMN A applies to **A ONLY**, **B ONLY**, **BOTH A AND B** or **NONE** of the items in COLUMN B. Write **A only**, **B only**, **both A and B**, or **none** next to the question number (1.3.1–1.3.7) in the ANSWER BOOK.

COLUMN A		COLUMN B
1.3.1	Excessive nutrients in water which cause dense growth of plants	A: Chlorosis B: Eutrophication
1.3.2	Involuntary muscle tissue	A: Cardiac B: Striated
1.3.3	Reduces friction between bones at joints	A: Hyaline cartilage B: Yellow elastic cartilage
1.3.4	Enzymes that break down dietary fats	A: Proteases B: Lipases
1.3.5	New rings of secondary xylem in stems	A: Annual rings B: Cambium rings
1.3.6	Mammalian tissue	A: Muscle B: Blood
1.3.7	Large, differentiated cells found in plant organs	A: Meristematic tissue B: Permanent tissue

(7 x 2) (14)

1.4 Study the diagrams below of food tests on organic compounds. Answer the questions that follow.



[Source: www.tes.com/teaching-resource]

1.4.1 Which organic compound is being tested in?

- (a) A
- (b) B

(2)

1.4.2 Name the chemical used to test for sugar. (1)

1.4.3 Give the positive colour changes for the following:

(a) A

(b) C

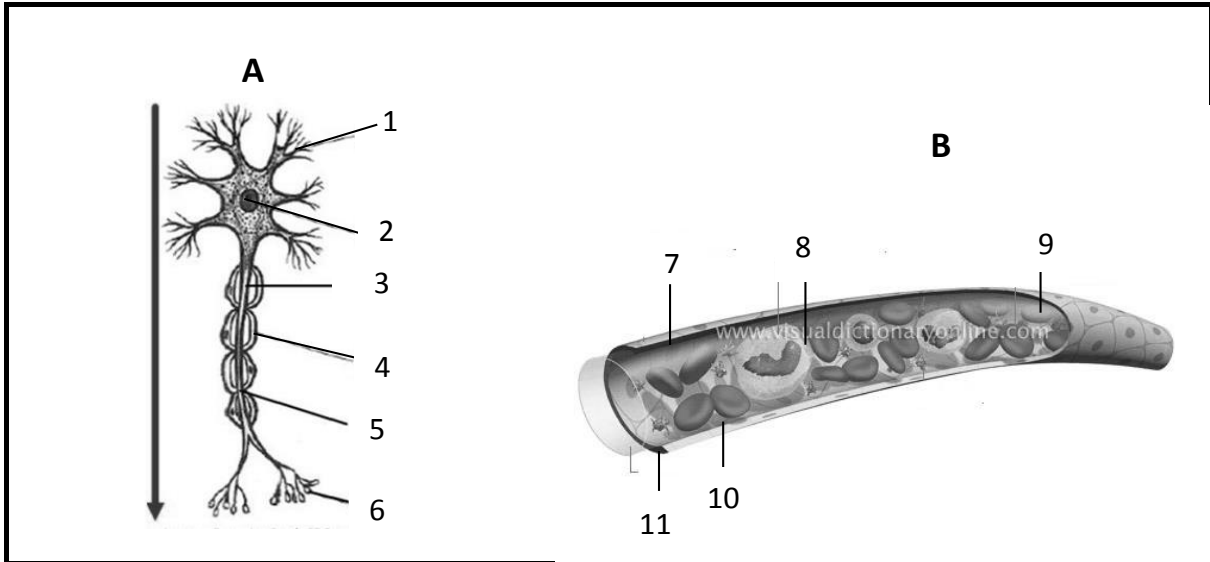
(c) D (3)

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 Study the diagrams below of animal tissue and answer the questions that follow.

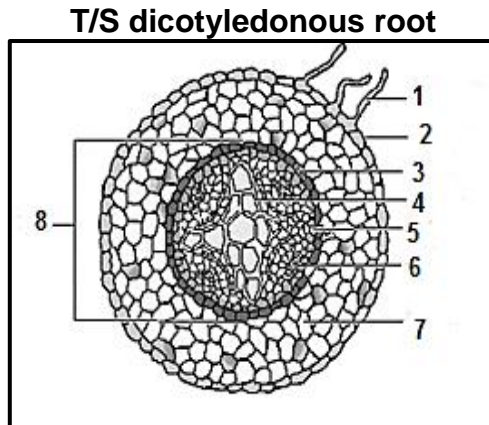


[Source: www.termandhistology.wordpress.com]

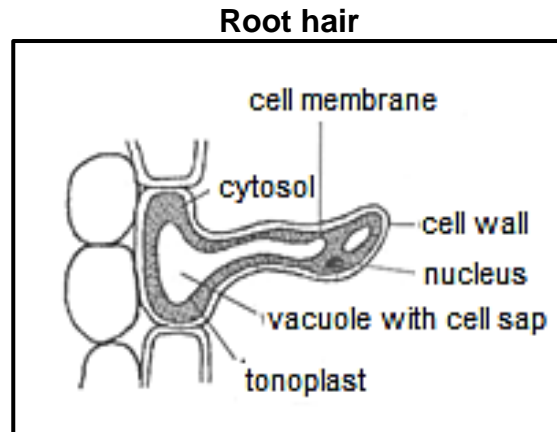
[Source: www.slideplayer.com]

- 2.1.1 Identify **A** and **B**. (2)
- 2.1.2 Provide labels for structures **3**, **4**, **8** and **10**. (4)
- 2.1.3 Give ONE function of cell **A**. (1)
- 2.1.4 Give the NUMBER of the structure that:
 - (a) Transports oxygen in the body (1)
 - (b) Defends the body against viruses and bacteria (1)
- 2.1.5 Discuss the effect on the body if tissue **A** is damaged. (3)

2.2 Study the diagrams below and answer the questions that follow



[Source: Plant-struktur.weebly.com]



[Source: www.sliderbase.com]

- 2.2.1 Provide labels for **1** and **2**. (2)
- 2.2.2 Give the number of the tissue that:
- (a) Gives rise to side/lateral roots (1)
 - (b) Transports organic food in the plant (1)
 - (c) Stores starch in the root (1)
 - (d) Transports water in the plant (1)
- 2.2.3 Give ONE way in which the root hair is structurally adapted for its function. (2)
- 2.2.4 Does the root hair have a cuticle? Give a reason for this. (3)
- 2.2.5 Predict what would happen if root hairs were not there at all. (2)

2.3 A scientist wanted to investigate whether light is required for the germination of seeds. She filled two plant pots of the same size with equal amounts of soil.

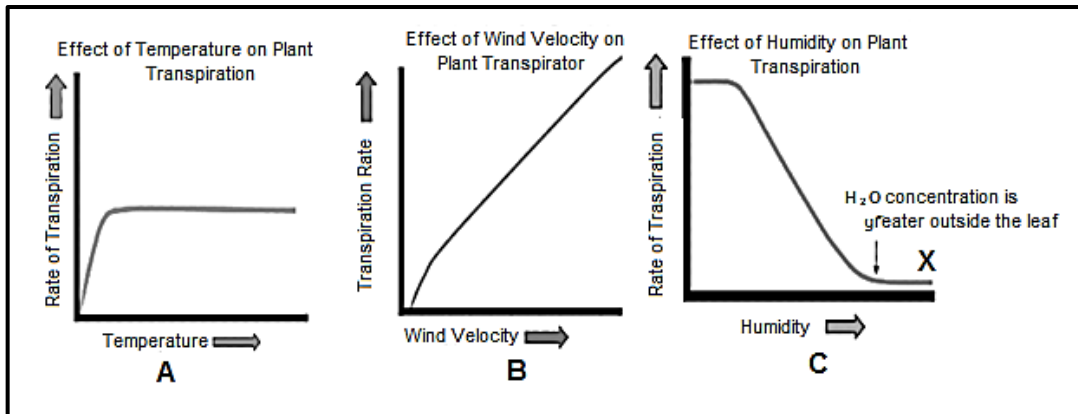
Pot 1 was labelled 'LIGHT' and Pot 2 'DARK'. Five lettuce seeds were planted in each of the pots. Both plants were given sufficient water.

Pot 1 was put in direct sunlight. A cardboard box was placed over Pot 2 and no light was allowed to enter.

- 2.3.1 Write down a hypothesis for the investigation. (2)

- 2.3.2 Identify the:
 - (a) Independent variable (1)
 - (b) Dependent variable (1)
- 2.3.3 List TWO variables that were kept constant. (2)
- 2.3.4 Suggest TWO ways in which the reliability of this experiment could be improved. (2)

2.4 Study the graphs below of transpiration rates in different environmental conditions and answer the questions that follow.



[Source: www.albet.io]

- 2.4.1 What does the term **transpiration** mean? (2)
- 2.4.2 Study graph **A**. What can you deduce about the relationship between temperature and transpiration rate? (2)
- 2.4.3 In graph **C**, explain the shape of the graph at **X**. (3)

[40]

QUESTION 3

3.1 The root of an onion is a rapidly growing part of the onion. Many cells will be in different stages of mitosis. A sample of an onion tip was stained and studied under a microscope.

The various phases of mitosis were identified and the number of cells counted in each phase. The results are recorded in the table below.

	Number of cells			
	1	2	3	Total
Interphase	47	49	58	154
Prophase	5	7	18	30
Metaphase	2	4	1	7
Anaphase	10	10	2	22
Telophase	4	4	4	12

3.1.1 Which phase produced the:

- (a) Highest number of cells
- (b) Lowest number of cells (2)

3.1.2 Calculate the percentage of cells produced during prophase. Show ALL calculations. (3)

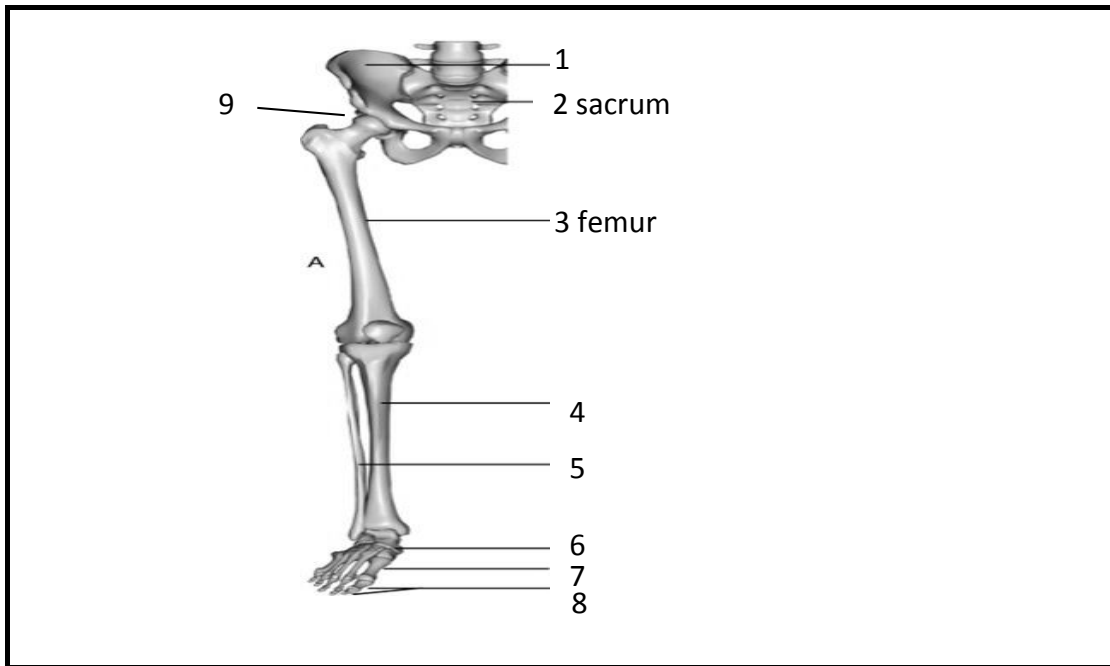
3.1.3 Briefly describe the importance of mitosis in a living organism. (2)

3.1.4 Assuming a cell takes 24 hours to complete one cycle. Calculate the duration of the interphase. Show ALL calculations. (3)

3.1.5 Briefly describe what happens during the anaphase of mitosis. (2)

3.1.6 Draw a bar graph to represent the total number of cells in each phase of the cell cycle. (6)

3.2 Study the diagram below of part of the pelvic girdle and lower limbs. Answer the questions that follow.



[Source: www.pocketdentistry.com/10-the-lower-limb]

- 3.2.1 Name the joint found at **9**. Give a reason why it has a deep socket (acetabulum). (2)
- 3.2.2 The femur is an example of a long bone. It contains both red marrow and yellow marrow. What is the function of the red marrow? (2)
- 3.2.3 Suggest a reason why the pelvic girdle needs to be rigid. (2)
- 3.2.4 Differentiate between *male* and *female hip bones*. (2)

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

The word arthritis means inflammation of the joints, and there are more than 100 forms of arthritis. One of the more common types is osteoarthritis.

Osteoarthritis occurs throughout the world and affects people differently, with joint damage developing over years or in some cases more quickly.

Osteoarthritis is a degenerative form of arthritis that often affects middle aged people, but can occur in young people who suffer from joint injuries.

Rheumatologists are doctors who are experts in diagnosing arthritis and other diseases of the joints, muscles and bones.

Warning signs of this disease are typically pain after an activity, limited range of motion and stiffness, and swelling and tenderness of one or more joints.

- 3.3.1 A joint is a region where two bones meet. Name the connective tissue that joins these bones. (1)
- 3.3.2 Name THREE classes into which joints may be categorised. (3)
- 3.3.3 Describe the condition of the joint if a person has osteoarthritis. (4)
- 3.3.4 Suggest ONE reason why osteoarthritis is more common in middle-aged people. (2)
- 3.3.5 Joint replacements are becoming more common amongst people suffering from osteoarthritis. Alloys of cobalt-chromium and titanium are usually used in these procedures. Why is iron not used? (4)
- [40]**

TOTAL SECTION B: 80

SECTION C**QUESTION 4**

- 4.1 The cell is regarded as the basic unit of life. It consists of a number of organelles that ensure its effective functioning.

Discuss this statement with reference to the structure and role of the cell membrane, nucleus and mitochondria.

NOTE: NO marks will be awarded for answers in the form of flow charts, tables or diagrams.

Content: (17)
Synthesis: (3)

TOTAL SECTION C: 20
GRAND TOTAL: 150