Education and Sport Development

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NORTH WEST PROVINCE

NATIONAL SENIOR CERTIFICATE

GRADE 10

LIFE SCIENCES

JUNE 2019

MARKS: 150

TIME: 2½ hours

This question paper consists of 11 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 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. ALL drawings should be done in pencil and labelled 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 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 correct answer and write only the letter (A –D) next to the question number (1.1.1 to 1.1.10) in your answer book, for example 1.1.11 D.

1.1.1 Which of the following is NOT a carbohydrate
A. Cellulose
B. Starch
C. Amino acid
D. Glycogen

1.1.2 The disease caused by a deficiency of Vitamin D is…
A. Scurvy
B. Pellagra
C. Rickets
D. Beriberi

1.1.3 A test was done for the presence of organic substances. Which of the following will indicate a positive result?
A. Brown colour with Iodine solution
B. Orange colour with Benedict solution
C. Blue colour with Fehling A and B solution
D. Violet with Millons-reagent

1.1.4 The substance that is a major component of a cell wall
A. Plastid
B. Cellulose
C. Protein
D. Chloroplast

1.1.5 The more active the cell is, the more _____ it contains.
A. vacuoles
B. chloroplast
C. mitochondria
D. chromosomes

Questions 1.1.6 and 1.1.7 are based on the following information below which are the characteristics related to organic compounds:

List of characteristics
i). contains hydrogen,
ii). contain hydrogen, oxygen and carbon only,
iii). energy source
iv) ratio of H:O is 2:1,
v) structure altered by excessive heat

1.1.6 Two characteristics related to lipids

A. (ii) and (iii) only
B. All of the above
C. (i) and (ii) only
D. (ii) and (v) only

1.1.7 Three characteristics related to carbohydrates
A. (i), (ii) and (v)
B. (ii), (iii), (iv) and (v)
C. All of the above
D. (ii), (iii) and (iv)

1.1.8 The red pigment in blood that carries oxygen is ……
A. Found in leucocytes
B. In blood platelets
C. Is not found in erythrocytes
D. Known as haemoglobin

1.1.9 Which type of epithelial tissue contains goblet cells?
A. Cuboidal
B. Columnar
C. Layered
D. Squamous

1.1.10 The process whereby one cell gives rise to two cells with the identical genetic make-up as the original cell.
A. Meiosis
B. Mitosis
C. DNA replication
D. Cell division

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 (1.2.1–1.2.8) in your ANSWER BOOK

1.2.1 The part of the microscope on which the slide or specimen rests
1.2.2 The pigment in the leaf that traps radiant energy
1.2.3 The structure that produces spindle fibres in an animal cell.
1.2.4 An organelle that contains digestive juices
1.2.5 A cancer tumour that doesn't penetrate the tissues of the body and is usually enclosed in a capsule
1.2.6 Type of skeleton supported by the pressure of liquid in earthworms
1.2.7 A type of immunity where antibodies is transferred from the mother to the baby via the placenta or breast milk
1.2.8 The part of the skeleton that forms the central axis **8 x 1 = (8)**

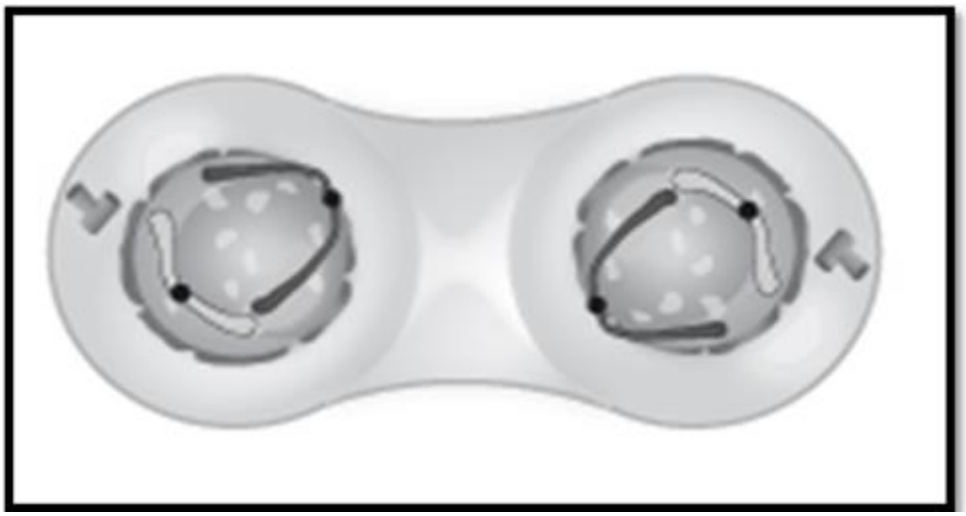
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1.3 Indicate whether each of the statements in COLUMN I apply to A only, B only, A and B or none of the items in COLUMN II. Write **A only, B only, A and B or None** next to the question number (1.3.1 – 1.3.5)

	COLUMN I	**COLUMN II**
1.3.1	Eutrophication	A. Over-utilization of fertilizers B. Algal bloom
1.3.2	Muscle tissues	A. Voluntary B. Involuntary
1.3.3	Cell walls mainly thickened in the corners	A. Collenchyma B. Sclerenchyma
1.3.4	A site for protein synthesis	A. Ribosomes B. Lysosome
1.3.5	Bone in the arm	A. Femur B. Fibula

5 x 2 = (10)

1.4 Study the following diagram and then answer the questions that follow.



1.4.1 Identify the phase that is shown in the diagram above. (1)
1.4.2 Give a suitable reason for your answer in 1.4.1 (2)
1.4.3 Draw a labelled diagram of the phase that occurs prior to the one shown in the diagram above. Use only 4 chromosomes in your diagram. (5)
1.4.4 Which process is represented by the above diagrams? (1)
1.4.5 Cancers are the result of uncontrolled cell division, which are caused by either external environmental factors or internal hereditary factors. State THREE methods that are used to treat cancer. (3)

(12)

TOTAL QUESTION 1 (50)
TOTAL SECTION A (50)

SECTION B

QUESTION 2

2.1 Study the table below, which illustrates the rate of water absorption by roots and the rate of transpiration by leaves

TIME	A Rate of water absorption (ml per hour)	B Rate of water transpiration (ml per hour)
06:00	1.5	0.5
08:00	1.5	2.0
10:00	3.2	4.5
12:00	4.5	6.0
14:00	5.7	7.4
16:00	7.6	9.3
18:00	8.0	5.5

2.1.1 Draw two line graphs on the same set of axis to illustrate these results. Name the graphs A and B. (7)

2.1.2 When does the maximum transpiration occur? (1)

2.1.3 List **TWO** environmental factors that can increase the rate of transpiration. (2)

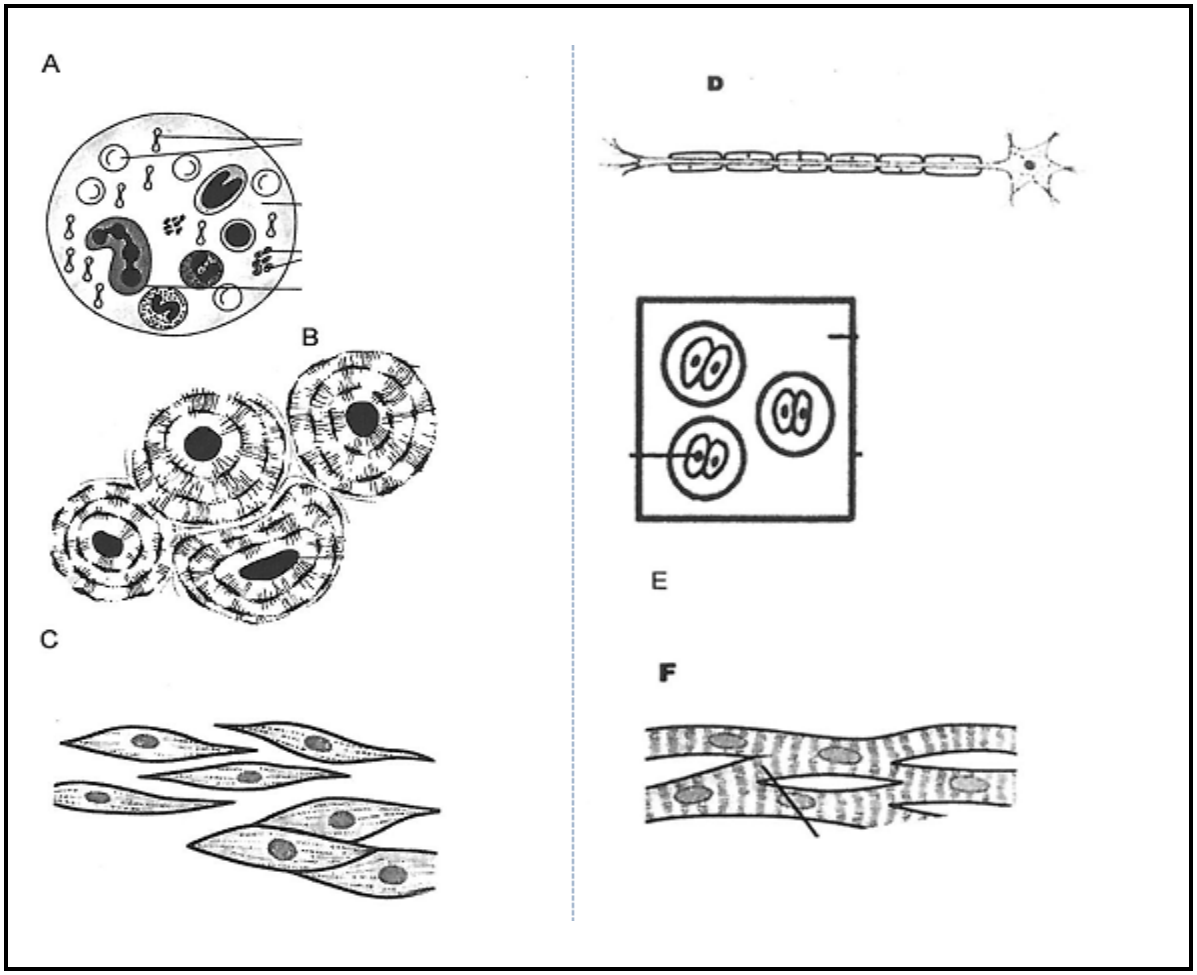
2.1.4 Calculate the amount of water absorbed between 12:00 and 18:00 (3)

2.1.5 Explain **ONE** way in which the reliability of the results could be improved. (2)

(15)

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2.2 Study the following diagrams of mammalian tissues and then answer the questions



2.2.1 Identify the mammalian tissue indicated by A, B and E (3)

2.2.2 Supply only the letters of
a. The tissues found in cartilage
b. The tissue that conducts impulses away from the CNS
c. Cardiac muscle (3)

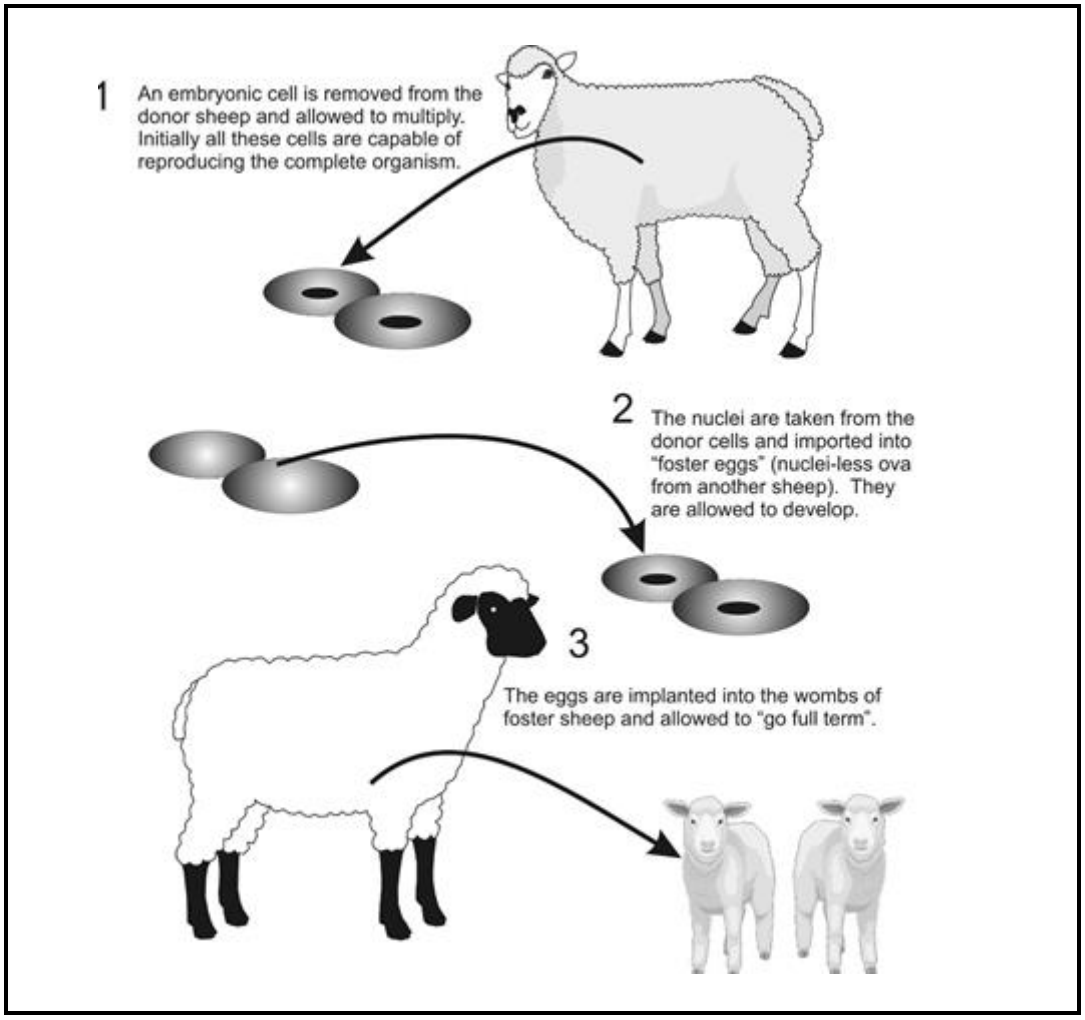
2.2.3 Erythrocytes have no nuclei. Without nuclei, erythrocytes can carry a higher amount of haemoglobin. Explain how this is an advantage in exchanging and carrying oxygen (2)

2.2.4 Other than erythrocytes, what are the other THREE main parts of tissue
A. (3)

2.2.5 Iron is essential for the synthesis of haemoglobin. If there is a shortage of iron in our diet, we become anaemic. Anaemic people have fewer red blood cells.
Explain why people who are anaemic:
a. Look pale (2)
b. Often feel tired and cold (2)

(15)

2.3 The diagrams below show how a sheep was cloned. Study the diagram and answer the question following it.



2.3.1 What is an embryonic stem cell? (2)

2.3.2 What significant material did the nucleus contain in order for cloning to occur? (1)

2.3.3 Explain why the lambs produced by the technique are identical to each other. (1)

2.3.4 Explain why the lambs are not genetically identical to the sheep which produced the eggs. (1)

2.3.5 Describe how cloning in animals or plants can be beneficial to humans (2)

2.3.6 Give any THREE reasons for some people to be against cloning (3)

(10)

TOTAL QUESTION 2 (40)

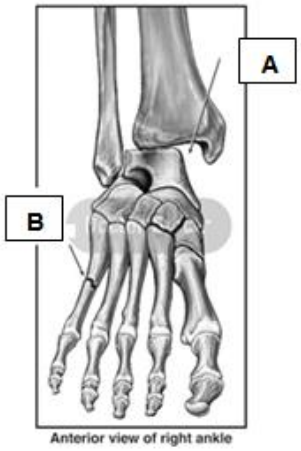
QUESTION 3

3.1 Study the diagrams below A (x- ray) and B (part of axial skeleton) and answer the questions that follow.
A boy fell off a tree and the X-ray below shows damage to his foot. One bone in the X- ray below has been broken and the other has been completely dislocated.

A. Part of axial skeleton



B. Schematic representation of an X-ray



3.1.1 Refer to diagram B (x- ray). Name the bone that is:
a. Broken (1)
b. Dislocated (1)

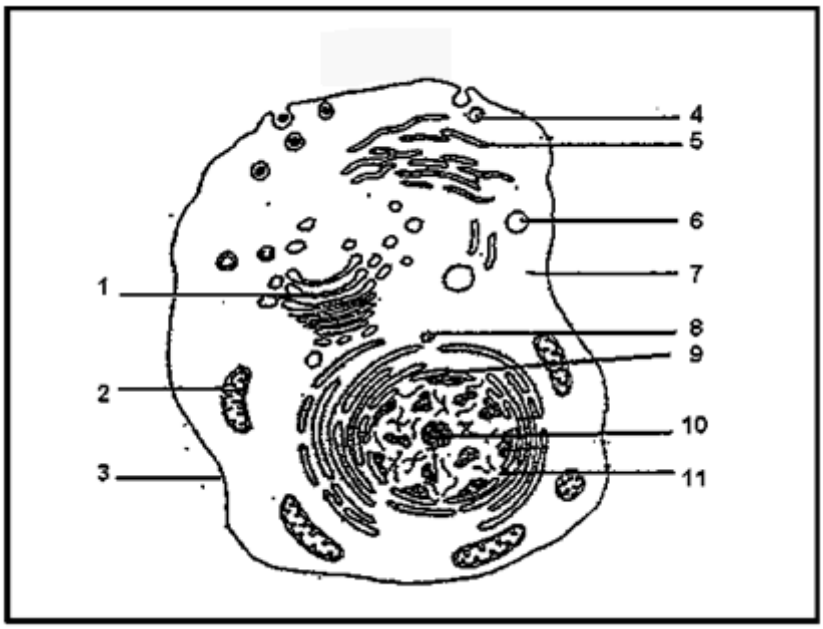
3.1.2 Differentiate between a sprain, fracture and dislocation. (6)

3.1.3 Identify the part of the axial skeleton shown in diagram A above. (1)

3.1.4 State the main function of the part of the skeleton identified in question 3.1.4 above. (2)

3.1.5 Name **FOUR** advantages of an exoskeleton. (4)
(15)

3.2 Study the diagram of a cell and answer the questions that follow:



3.2.1 Is the diagram above, of a plant or animal cell? (1)

3.2.2 Give **TWO** visible reasons from the diagram to support your answer to question 3.2.1 above. (2)

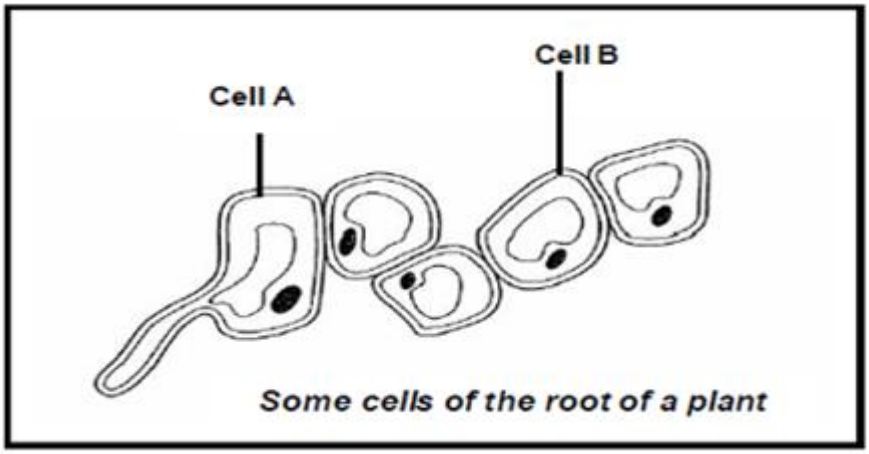
3.2.3 Give the number only of the part that is said to be differentially or semi-permeable. (1)

3.2.4 Label and give one function of the parts labelled 1, 2 and 3. (6)

3.2.5 Tabulate **TWO** differences between a plant and an animal cell. (5)

(15)

3.3 Study the following diagram and answer the questions that follow.



3.3.1 Identify cell A and Cell B. (2)
3.3.2 State **TWO** adaptations of cell A that will enable it to absorb water. (2)
3.3.3 What is the pathway along which water moves from cell A to cell B. (1)
3.3.4
a. What term is given to a membrane that allows only certain substances to pass through it? (1)
b. Explain **TWO** ways in which the xylem of the diagram above, adapted to perform its function. (4)

(10)

TOTAL QUESTION 3 (40)
TOTAL SECTION B (80)

SECTION C

QUESTION 4

4.1 Organic compounds, required as part of a daily diet, differ in their elements, monomers, as well as functions. Write an essay to show this comparison.

Content: 17
Synthesis: 3
(20)

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

TOTAL SECTION C: (20)

GRAND TOTAL: 150