Education and Sport Development
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NORTH WEST PROVINCE

PROVINCIAL ASSESSMENT

GRADE 10

LIFE SCIENCES

JUNE 2018 EXAMINATION

MARKS: 150

TIME : $2\frac{1}{2}$ hours

This question paper consists of 13 pages.

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions that follow.

1. Answer ALL the questions
2. Write ALL the answers in the ANSWER BOOK
3. Number the answers correctly according to the numbering system in this question paper
4. Present your answers according to the instructions of each question
5. ALL drawing should be done in pencil and labeled in blue or black pen
6. Only draw diagrams and flow charts when asked to do so
7. Non-programmable calculators, protractors and compasses may be used
8. Write NEATLY and LEGIBLY

SECTION A

QUESTION 1

1.1 Various possible options are provided as answers to the following questions. Choose the correct answer and write only the answer (A-D) next to the question number (1.1.1 to 1.1.10) in the answer book (e.g. 1.1.1. A)

1.1.1 Which of the following is NOT a process responsible for the movement of substances across membranes?

A. Guttation
B. Diffusion
C. Osmosis
D. Active uptake

1.1.2. Which statement is NOT true about the functions of the components of blood?

A. White blood cells engulf foreign bodies
B. Platelets are responsible for blood clotting
C. Red blood cells fight against infection
D. Plasma carry nutrients and dissolved substances around the body

1.1.3 Which of the following animal tissue is NOT an epithelial tissue?

A. Ciliated
B. Areolar
C. Columnar
D. Squamous

1.1.4 Which of the following is a disease caused by the deficiency of vitamin C?

A. Rickets
B. Scurvy
C. Pellagra
D. Kwashiorkor

1.1.5 Enzymes are said to be catalysts because they…

A. are protein in nature.
B. alter the rate of biological chemical processes.
C. are affected by pH and temperature.
D. are affected by pH but not by temperature.

1.1.6 An external skeleton such as the chitinous skeleton of arthropods is called…

A. axial skeleton.
B. hydrostatic skeleton.
C. endoskeleton.
D. exoskeleton.

1.1.7 A potometer is used to measure the rate of …

A. respiration.
B. germination.
C. transpiration.
D. photosynthesis.

1.1.8 Which of the following substances would give a positive result with Iodine solution?

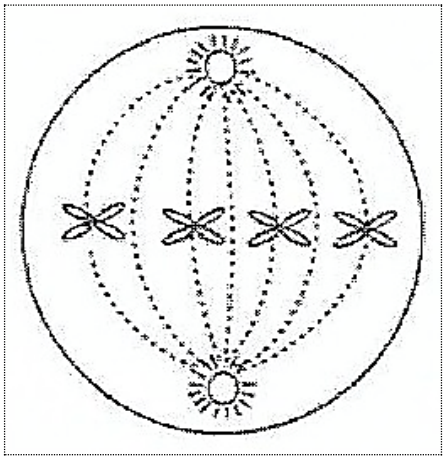
A. Fat
B. Starch
C. Glucose
D. Vitamins

1.1.9 Which of the following is NOT part of the axial skeleton?

A. Skull
B. Pectoral girdle
C. Vertebral column
D. Sternum

1.1.10 The diagram below shows a stage of the process of cell division.
After completion of this division, the nucleus of each new cell will have…chromosomes.

A . four
B two
C eight
D sixteen



(10 × 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)

1.2.1 A photograph taken through an electron microscope

1.2.2 The substance that an enzyme acts upon

1.2.3 The opening at the base of the scull which receives the spinal cord

1.2.4 Muscles working in opposition to one another

1.2.5 The nutritional condition caused by a shortage of protein in the diet

1.2.6 Ribs that are not attached to the sternum at all

1.2.7 The organelle that is responsible for giving energy to cells

1.2.8 The type of epithelium lining the breathing passages which has hair-like outgrowths

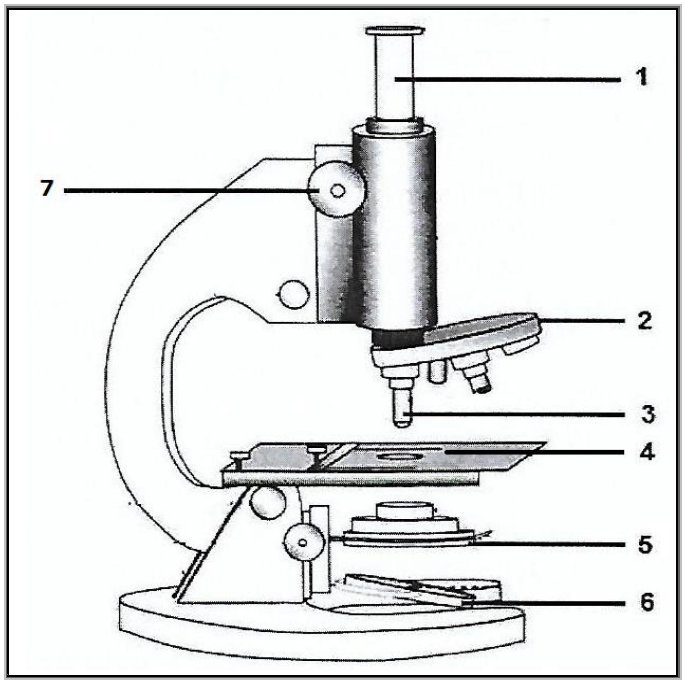
(8 × 1) (**8**)

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, Both A and B** or **NONE** next to the question number **(1.3.1 to 1.3.8)** Example 1.3.1 Both A and B

COLUMN A	**COLUMN B**
1.3.1 Micro element	A Nitrogen B Magnesium
1.3.2 Organelle that acts as a transport system in cells	A Nucleus B Endoplasmic reticulum
1.3.3 Through cell division they produce new cells for growth	A Collenchyma B Meristem
1.3.4 Strengthen and support parts of plants	A Xylem B Sclerenchyma
1.3.5 A solution with a higher water potential	A Hypertonic B Hypotonic
1.3.6 Elongated chlorophyll-containing cells below the upper epidermis	A Palisade B Spongy
1.3.7 Cytokinesis by cell plate formation	A Plant cells B Animal cells
1.3.8 A type of skeleton found inside the body	A Exoskeleton B Hydrostatic skeleton

(8 × 2) (**16**)

1.4 Study the diagram below representing a light microscope and answer the questions that follow.



1.4.1 Label parts numbered 1, 3 and 7. (3)

1.4.2 What is the function of the part labeled 2? (1)

1.4.3 Describe how you can prevent air bubbles forming on a microscope wet mount (2)

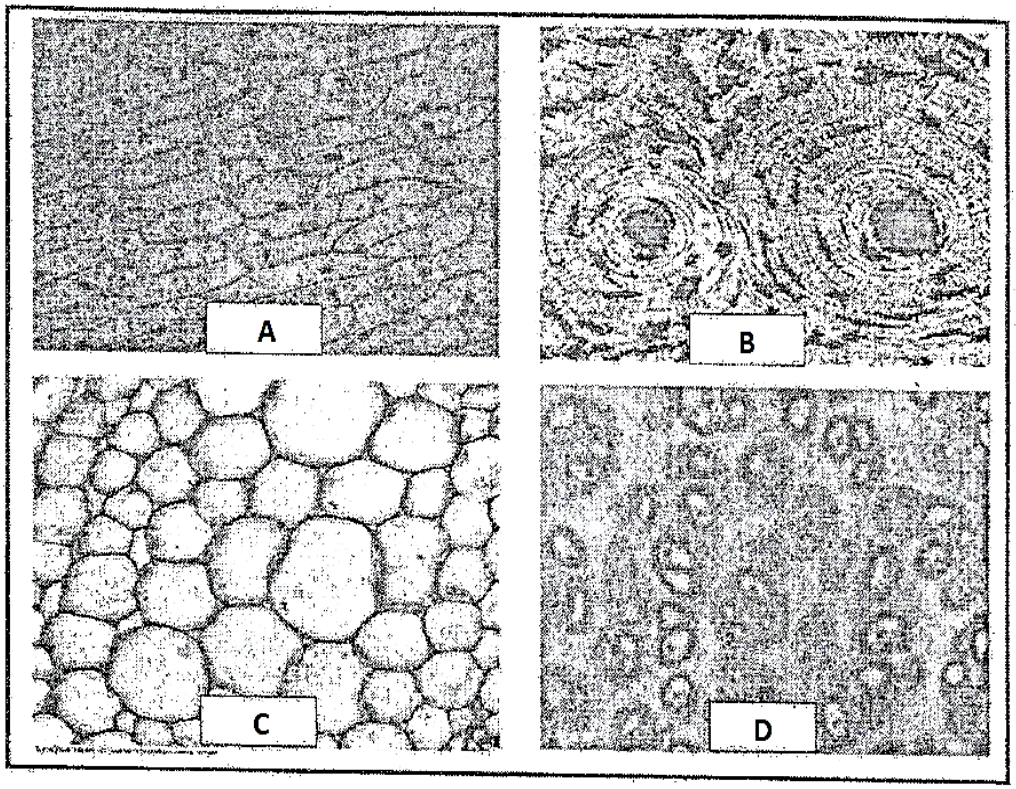
[6]

TOTAL QUESTION 1: 50

TOTAL SECTION A : 50

SECTION B
QUESTION 2

2. 1 The micrographs below show different plant and animal tissues.
Study them and answer the questions that follow.



2.1.1 Identify the tissues labeled A, B and D. (3)

2.1.2 Give the letter of the tissue that…

(a) serves as packaging tissue. (1)

(b) reduces friction between bones and joints. (1)

(c) provides a surface for the attachment of muscles. (1)

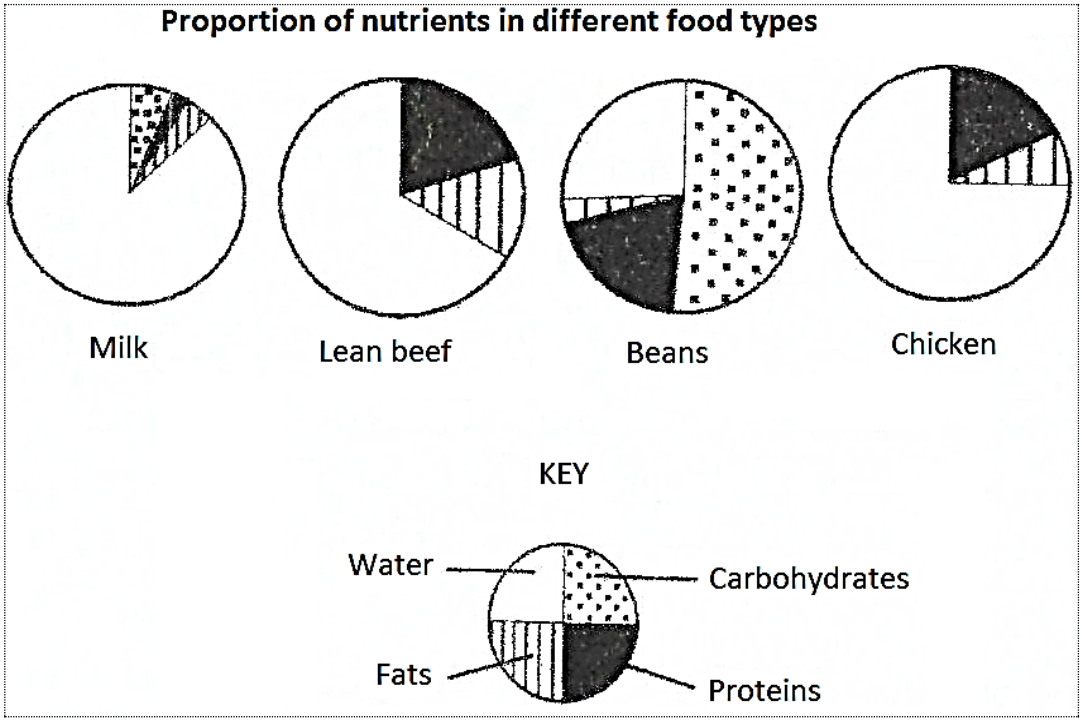
[6]

2.2 Study and complete the following table on animal tissues by simply writing down the letter
and the answer corresponding to the letter.

Type of tissue	Location	Function
2.2.1	Lines the inside of the small intestines	Absorbs food
Striated muscle	2.2.2	Responsible for all voluntary actions
Sensory neuron	Between sense organs and central nervous system	2.2.3

(3×1) **[3]**

2.3 Study the pie charts below of four food types and answer the questions that follow.



2.3.1 Name:

(a) ONE food type which will be **most** suitable for insulating the body. (1)

(b) ONE food type which is **least** suitable for growth. (1)

2.3.2 Name TWO food types that will only form amino acids, fatty acids and glycerol after digestion. (2)

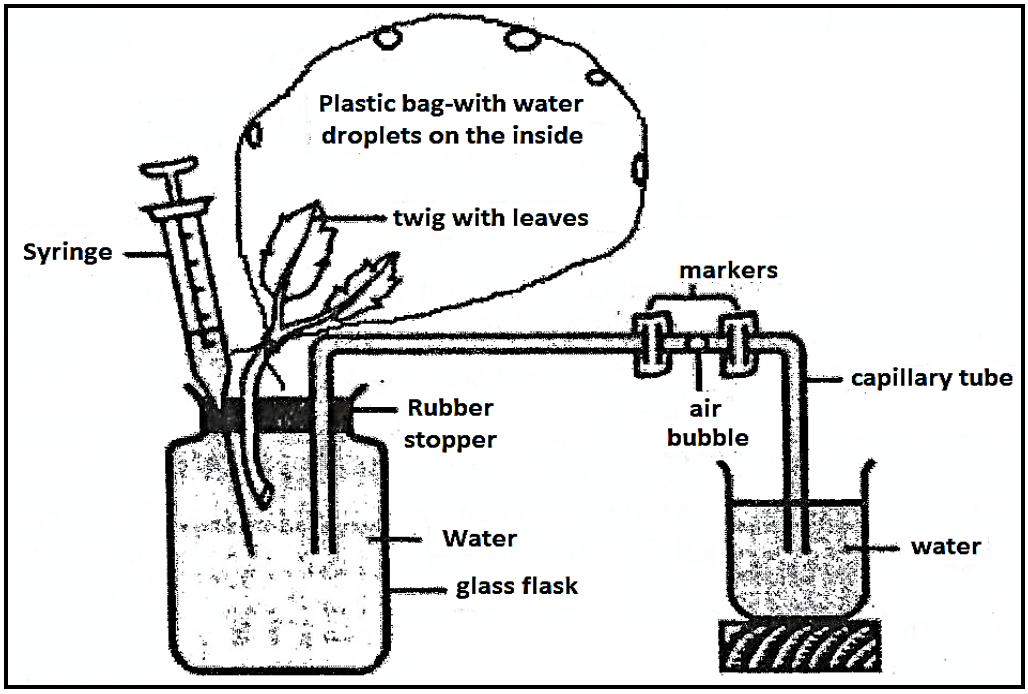
2.3.3 Name ONE food type that is **most** suitable to supply energy. (1)

2.3.4 Explain your answer in question 2.3.3 (1)

[6]

2.4 Study the diagram below that shows an investigation on one of the factors which affect the rate

of transpiration in a plant.



2.4.1 What is transpiration? (2)

2.4.2 Which environmental factor is being investigated in the above set up? (1)

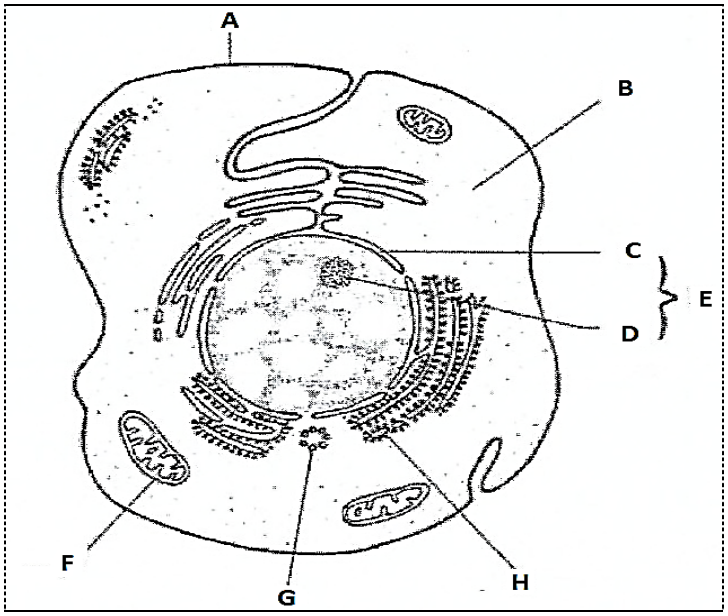
2.4.3 Name TWO other environmental factors that could influence the validity of this investigation if not well controlled. (2)

2.4.4 Name the part of the plant that is responsible for transportation of water and minerals in the plant above. (1)

2.4.5 Draw a labeled diagram of the cross section of the stem to show the part you named in QUESTION 2.4.4 as it appears if the water was coloured with red eosin. (6)

[12]

2.5 Study the diagram below representing a cell of a living organism and answer the questions that follow.



2.5.1 Does this cell represent a plant or animal cell? (1)

2.5.2 Give TWO visible reasons for your answer in QUESTION 2.5.1. (2)

2.5.3 Write down only the LETTER of the part that is associated with the:

(a) process of cellular respiration (1)

(b) transmission of hereditary characteristics (1)

2.5.4 The vacuole is membrane bound and plays an important role in plant cells.

(a) What is the name of the membrane surrounding a vacuole? (1)

(b) List TWO functions of the vacuole in plant cells. (2)

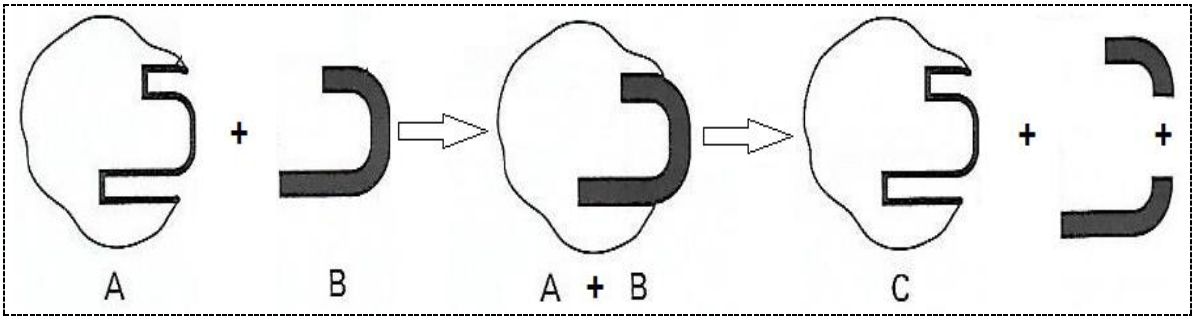
2.5.5 Tabulate TWO differences between plant and animal cells (5)

[13]

TOTAL QUESTION 2: 40

QUESTION 3

3.1. The sketch below illustrates a mechanism (theory) on how enzymes work.
Study it and answer the questions that follow.



3.1.1 Write the LETTER of the component that represents an enzyme. (1)

3.1.2 Give a reason for your answer in QUESTION 3.1.1 (1)

3.1.3 What is the collective name for components labelled **A + B**? (1)

3.1.4 Identify the theory represented in the above sketch. (1)

3.1.5 Give ONE reason why enzymes are important in living organisms. (1)

3.1.6 Briefly outline what would happen if the temperature at which the above enzyme functions at is increased far above the optimum temperature. (3)

[8]

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

Stem cell research is currently being conducted all over the world in the hope that it will lead to their successful use in the treatment of a large variety of disorders and diseases. Adult stem cells are already used in bone marrow transplants used to treat people suffering from leukaemia.

Embryonic stem cells are especially grown in laboratories from human embryos. However, in some countries this stem cell research is limited to stem cells taken from cord blood and those taken from embryos which have already been destroyed. Not everyone agrees with the ethics of stem cell research.

[Adapted from: Understanding Life Sciences, Grade 10]

3.2.1 What are stem cells? (2)

3.2.2 Give TWO sources from which human stem cells can be harvested. (2)

3.2.3 Explain TWO examples how stem cells can be used to cure diseases. (4)

3.2.4 Explain ONE argument:

(a) for the use of stem cells (2)

(b) against the use of stem cells (2)

[12]

3.3 Different levels of exposure to different carcinogens result in the cells dividing uncontrollably and this ultimately causes cancer.

The table below shows the record on the prevalence of different types of cancer amongst males and females in a part of a population of a particular country in the year 2014. Study it and answer the questions that follow.

TYPE OF CANCER	% OF AFFECTED INDIVIDUALS IN A POPULATION	
	FEMALES AFFECTED (%)	MALES AFFECTED (%)
Breast	22	8
Lung	12	63
Blood	5	5
Bone marrow	1	3
Skin	45	50

3.3.1 What is meant by the term carcinogens? (1)

3.3.2 Which type of cancer is most prevalent among males? (1)

3.3.3 Identify the:

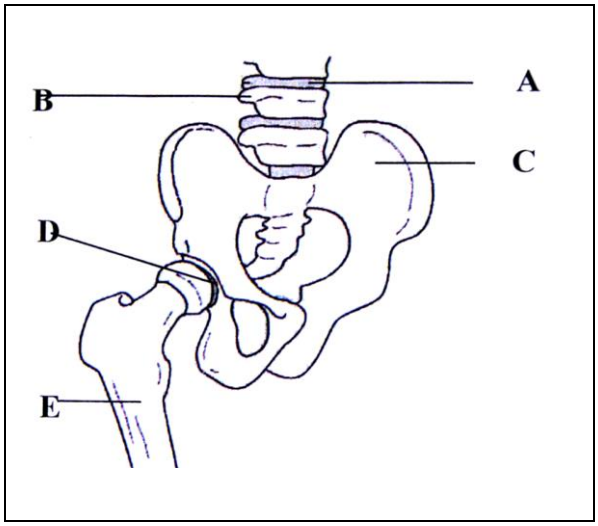
(a) independent variable (1)

(b) dependent variable (1)

3.3.4 Draw bar graphs on the same set of axes representing the information on the table (9)

[13]

3.4 Study the diagram below and answer the questions.



3.4.1 Provide labels to parts A, C and E. (3)

3.4.2 List ONE disease that affects the bones of the skeleton. (1)

3.4.3 Name the type of joint found at
(a) D
(b) A. (2)

3.4.4 What is the function of tendons on the skeleton? (1)

[7] TOTAL QUESTION 3: 40

TOTAL SECTION B : 80

SECTION C

QUESTION 4

Mitosis is a process that results in a single cell dividing many times in order to bring about the process of growth. Write an essay describing the process of mitosis.
Also explain what cancer is.

Content (17)
Synthesis (3)
[20]

<u>NOTE</u>: NO marks will be awarded for answers in the form of flow charts or diagrams

TOTAL SECTION C: 20

GRAND TOTAL: 150