Education and Sport Development
Department of Education and Sport Development
Departement van Onderwys en Sport Ontwikkeling
Lefapha la Thuto le Tlhabololo ya Metshameko
NORTH WEST PROVINCE

NATIONAL SENIOR CERTIFICATE

GRADE 10

LIFE SCIENCES

JUNE EXAMINATION 2017

MARKS: 150

TIME: 2½ hours

This question paper consists of 17 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.

SECTION A

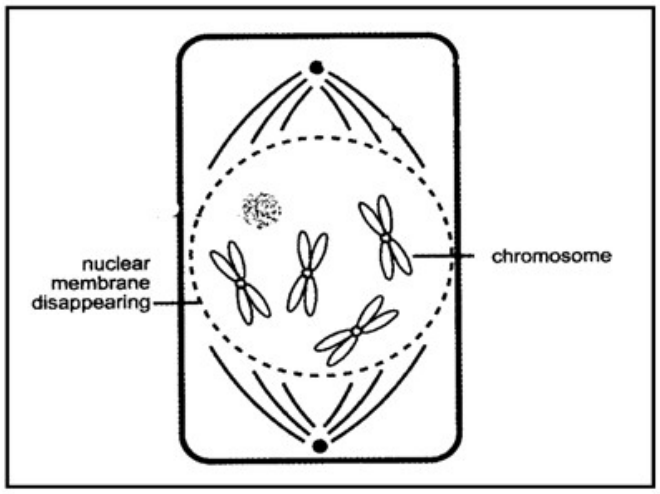
QUESTION 1

1.1 Various options are provided as possible answers to the following questions. Choose the correct answer and write only the letter (A to 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 A deficiency disease as a result of a shortage of Vitamin B.

A night blindness
B rickets
C beri-beri
D pellagra

1.1.2 The following diagram is made of a dividing cell under a microscope.



What is your observation and conclusion about this cell?

A The cell wall is still intact, the cell is not ready for mitosis.
B The nuclear membrane has disappeared, it is in the telophase
C stage of mitosis.
D There are 4 daughter chromosomes, they are all female. Chromosomes are clear, the nuclear membrane has disappeared, it is during prophase of mitosis.

1.1.3 Carcinogens such as cigarette smoke and UV-rays cause …

A epilepsy
B tuberculosis
C goitre
D cancer

1.1.4 Which one of the following is responsible for preventing water loss

A epidermis cells
B xylem
C palisade cell
D cuticle

1.1.5 The following tissue is an example of:

A cardiac
B skeletal muscle
C smooth muscle
D involuntary muscle

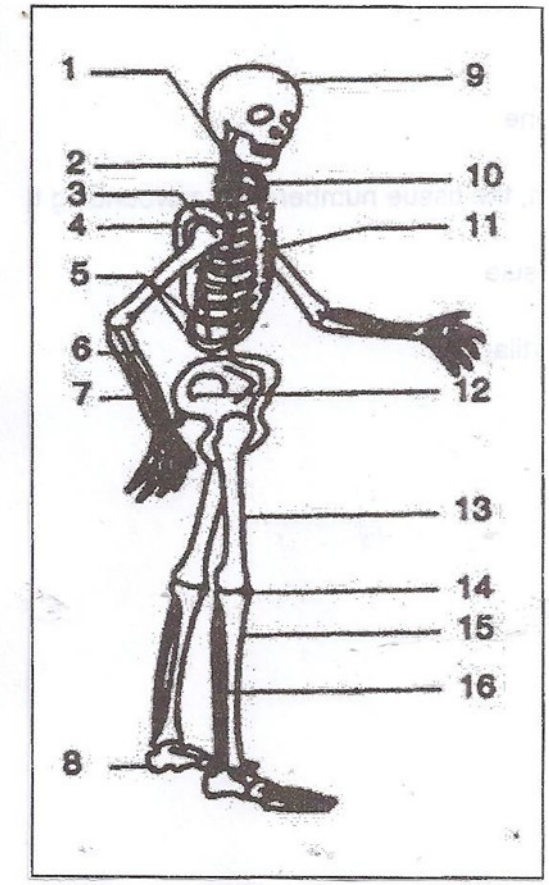
1.1.6 The foramen of magnum is found in the….

A lower limb
B skull
C spinal column
D upper limb

1.1.7 The more active the cell is, the more ---------- it contains.

A vacuoles
B chloroplasts
C mitochondria
D chromosomes

1.1.8 The pectoral girdle consist of bone(s) numbered….



A 12 only
B 3, 4, 5, 6 and 7
C 4 and 10 only
D 4, 5 and 10 only

1.1.9 When using a light microscope, magnification of the structure being observed can be increased by a variation in the…

A light intensity
B stage position
C objective lens power
D iris diaphragm setting

1.1.10 Which of the following is not an example of connective tissue?

A blood
B bone
C epithelium
D cartilage **(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 1.2.8) in your ANSWER BOOK.

1.2.1 Two opposite pairs of muscles working together to make one skeletal movement possible

1.2.2 The deficiency disease that results from a lack of protein.

1.2.3 Simplest form of carbohydrates

1.2.4 The type of animal tissue which removes mucus and dust from the airways.

1.2.5 An organelle in a cell that is the site for protein synthesis

1.2.6 A permanent tissue found in all parts of the plants that provides mechanical support

1.2.7 Specialised proteins that speed up the chemical reaction.

1.2.8 A movement of gas molecules from a high concentration to a low concentration.

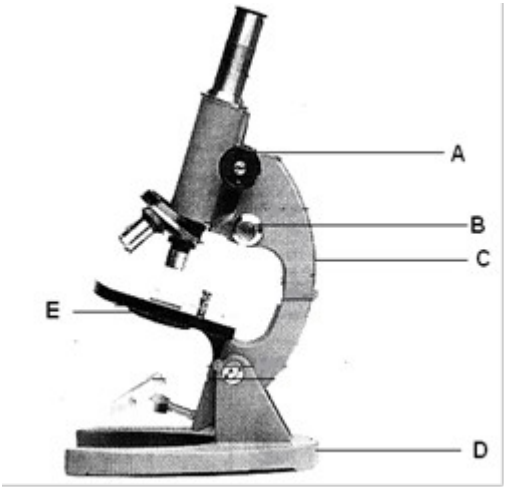
(8)

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 1.3.6) in the ANSWER BOOK.

	COLUMN I	COLUMN II
1.3.1	Building blocks (monomers) of carbohydrates	A. Glycerol B. Fats
1.3.2	Water	A. Organic compound B. Inorganic compound
1.3.3	The use of chemicals to destroy the cancer cells	A. Radiotherapy B. Surgical removal
1.3.4	Connects two chromatids to form a chromosome	A: Centromere B: centriole
1.3.5	The plastids in a plant cell	A. Leucoplast B. Golgi bodies
1.3.6	Vascular bundles	A. Xylem B. Phloem

(6 x 2) **(12)**

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

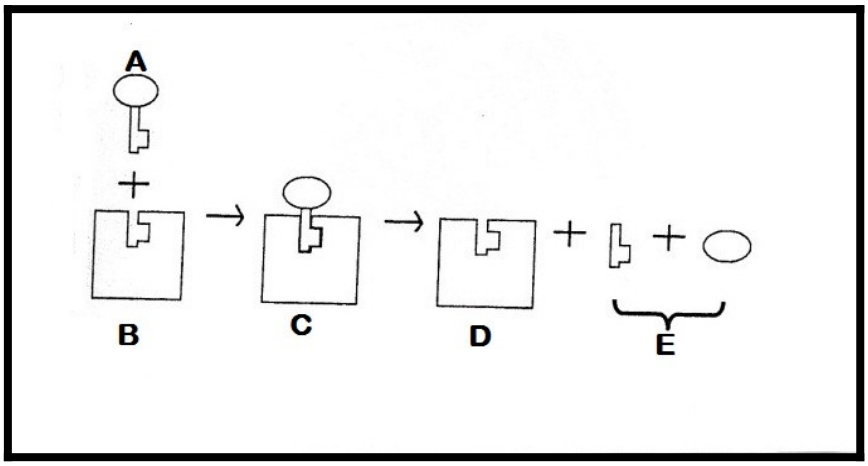


1.4.1. Identify the above apparatus? (1)

1.4.2. Provide labels for parts A, C, D and E. (4)

(5)

1.5 Study the structure below of an enzyme activity and answer the questions that follow



1.5.1. From the diagram which structure(A,B,C,D or E) represents:

a. Products (1)

b. Substrate (1)

c. Enzyme (1)

1.5.2. With reference to the diagram above, which theory is used by scientists to explain how enzymes work? (2)

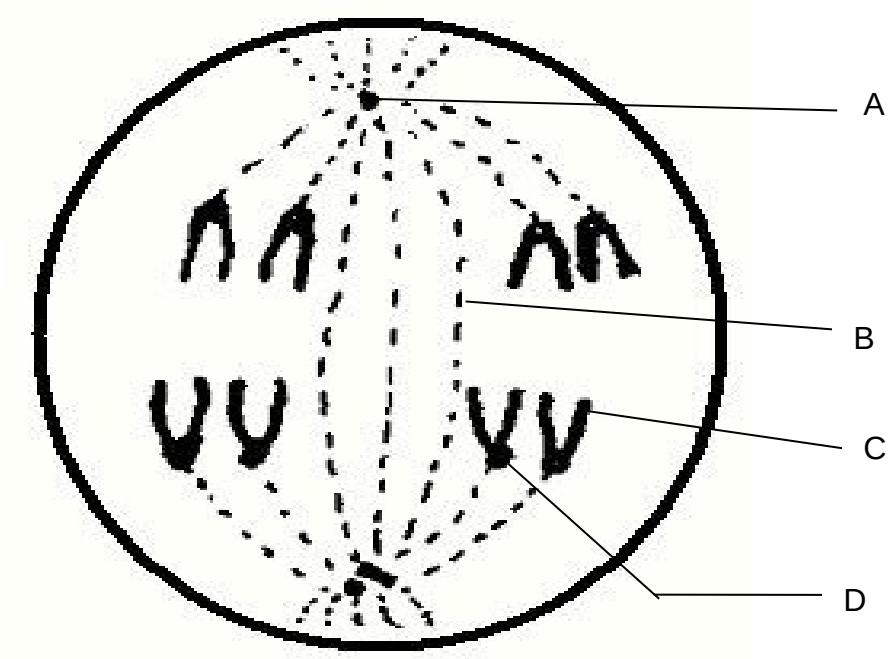
(5)

TOTAL SECTION A : 50

SECTION B

QUESTION 2

2.1 The following diagram shows a plant cell at the beginning of cell division:



2.1.1. Provide labels for parts A,B,C and D (4)

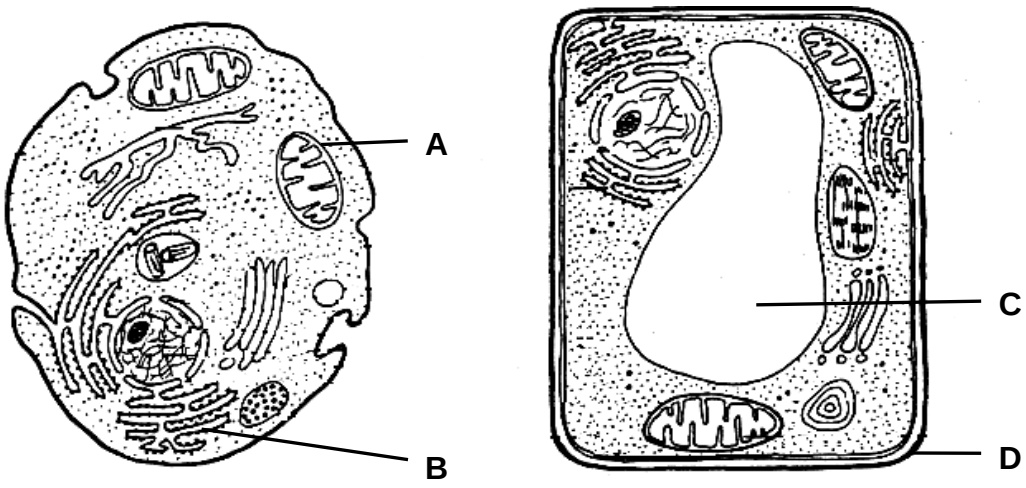
2.1.2. How many chromosomes are shown in the diagram above? (1)

2.1.3. How many chromosomes would be found in the daughter cells at end of cell division of the above cell? (1)

2.1.4. Explain TWO ways in which mitosis is biologically significant. (2)

(8)

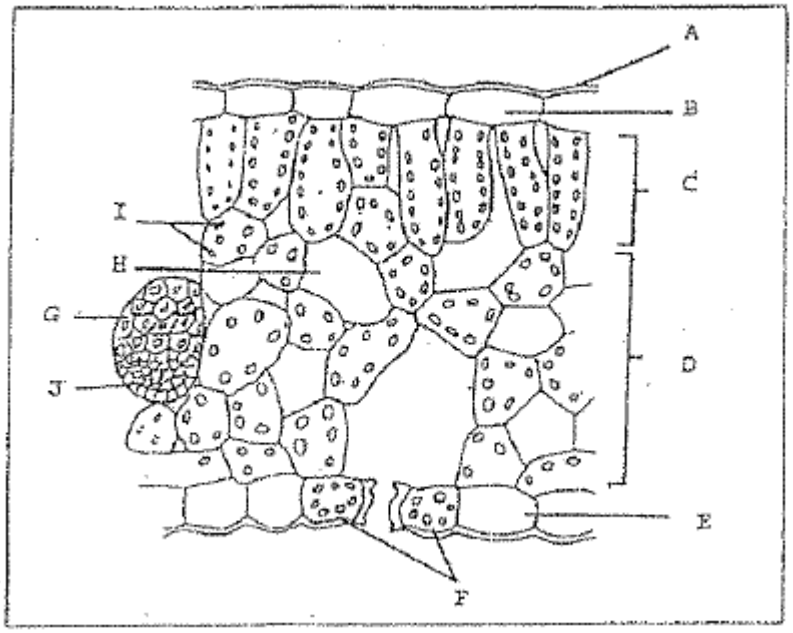
2.2 S



Cell X **Cell Y**

2.2.1	Which cell, (X or Y) represents a plant cell?	(1)
2.2.2	Give ONE visible reason for your answer to 2.1.1.	(1)
2.2.3	Provide labels for parts A and B.	(2)
2.2.4	Structure C plays an important role in cell Y. List TWO functions of this structure.	(2)
2.2.5	Which structure (A, B, C or D) plays a role in energy supply?	(1)
2.2.6	Tabulate two visible difference between Cell X and Cell Y.	(5)
		(12)

2.3 Study the following diagram showing a part of a section through a leaf blade and answer the questions below.



2.3.1 Write down the LETTER and NAME of any one structure representing an adaptation that…

a) makes carbon dioxide available for photosynthesis.

b) makes water available for photosynthesis. (4)

2.3.2 Name the cells labelled C. (1)

2.3.3 Describe TWO ways in which the cells named in 3.1.2 above are adapted for photosynthesis. (4)

2.3.4 Identify the cells labelled D. (1)

2.3.5 Describe the shape of the cells mentioned in 3.1.4 and explain how this shape is an advantage for processes taking place in the leaf. (3)

2.3.6 State ONE visible difference between E and F. Discuss the significance of this difference. (4)

2.3.7 Predict what would happen if tissues B and E were covered with Vaseline. (3)

(20)
[40]

QUESTION 3

3.1 The following nutritional information is printed on a box of breakfast cereal. Study the table and answer the questions that follow.

Nutrients present in cereal	**30 g of cereal contain:**
Proteins	4.2 g
Carbohydrates	22.4 g
Fat	0.5 mg
Iron	18 mg
Vitamin B_1	1.5 mg
Fibre (roughage)	5.7 g

3.1.1 Which type of nutrient makes up the largest part of 30g of above cereal? (1)

3.1.2 Name the building blocks of the type of nutrient named in question 1.4.1. (1)

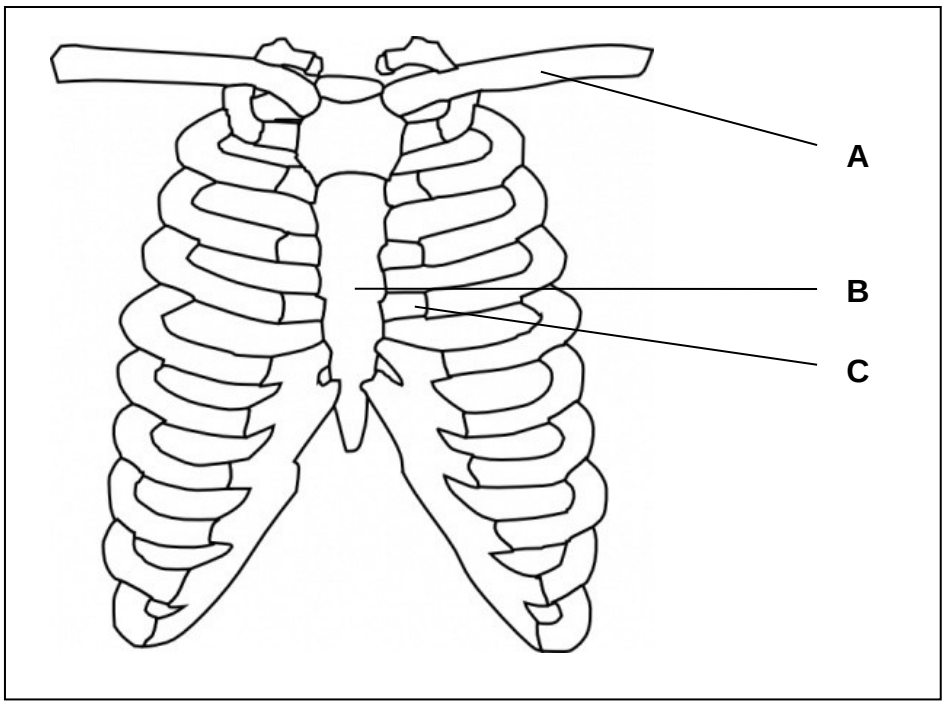
3.1.3 Name **THREE** functions of protein in the human body. (3)

3.1.4 Draw a simple diagram to show the structure of a lipid, label the parts clearly. (4)

3.1.5 Name an inorganic nutrient in this cereal. (1)

(10)

3.2 Study the diagram of the human rib cage and answer the questions that follow.



3.2.1 Give the scientific names of parts labelled A, B and C. (3)

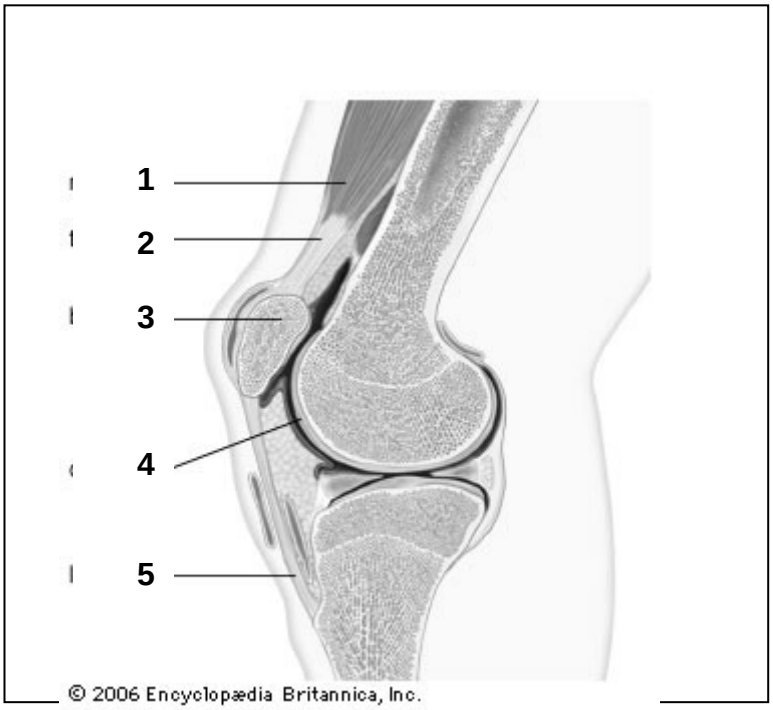
3.2.2 To which structure are the ribs attached at the back/rear of the rib cage? (1)

3.2.3 Which **TWO** vital organs are protected by the rib cage? (2)

3.2.4 Name the disease of the skeletal system in which bones become brittle from loss of bone mass. (1)

(7)

3.3 Study the following diagram of a human knee and answer the questions that follow.



3.3.1 Complete the following table by only writing down the correct answer to the corresponding letters **a** to **e** in your answer script. (5)

Labelled part	Name of connective tissue	Description	Function
1	Muscle	Has muscle fibres, are striped, striated, can contract and relax	Contract and relaxes to make movement possible
2	**a.**	Has white inelastic fibres	Connect **....b...**
3	Bone	Has Haversian canals with osteocytes	Give shape, support and protection

4	**c.**	**d.**	Reduces friction between bones
5	**e.**	Has yellow elastic fibres	

3.3.2 Name the type of synovial joint found in the human knee. (1)

(6)

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

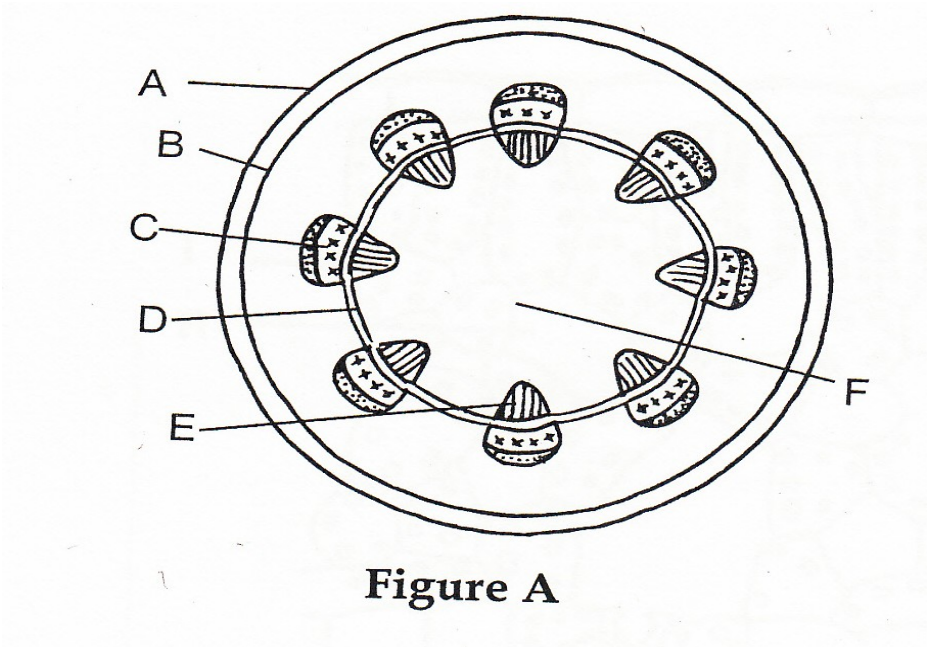


Figure A

3.4.1 Identify Figure A. (1)

3.4.2 Provide TWO visible reasons for your answer in question 3.4.1. (4)

3.4.3 Explain how part E is structurally adapted for its function. (3)

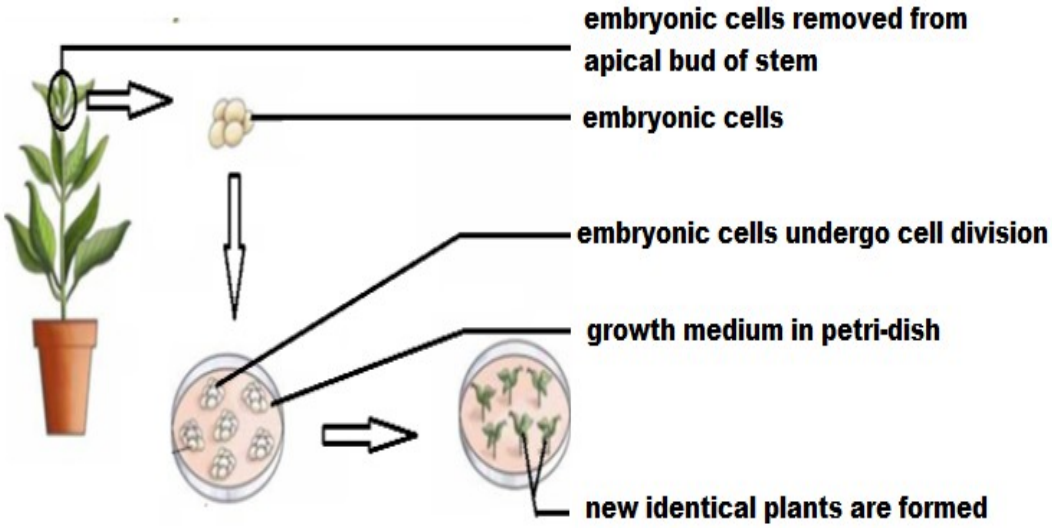
3.4.4 Is it possible to determine in which year or years the tree experienced a relatively dry year? (1)

3.4.5 Provide a reason for your answer to QUESTION 3.4.4. (1)

[10]

3.5 A group of Grade 10 learners want to make a contribution to the community by providing vegetables to the poor people. They would like to breed their own plants. They decide to perform a scientific investigation before they start with their project.

They conduct the following biotechnological process to determine if they can use embryonic cells (stem cells) to breed bean plants on a growth medium. They repeat the method more than 5 times to ensure reliable results.



2.2.1 3.5.1. Formulate a hypothesis for this scientific investigation. (2)

3.5.2. Name the biotechnological process illustrated by this scientific method. (1)

3.5.3. Identify TWO variables that must be kept constant to ensure validity when this experiment is repeated. (2)

3.5.4. What do we call the cell division process whereby new plants are Formed? (1)

3.5.5. Supply ONE reason why people are against the use of this biotechnological process. (1)

(7)

[40]

TOTAL SECTION B: 80

SECTION C
QUESTION 4

4.1
Multicellular organisms are made up of millions of cells and therefore need some form of organisation to perform various functions when carrying out life processes. To do this, cells become specialised by developing a specific shape, having chemical changes taking place in the cytoplasm and losing the ability to divide. These changes allow cells to become adapted to perform a specific function.

Using the foot as an example of how cells become specialised to become adapted to perform a specific function, write an essay discussing the different tissues that assist in moving the organism.

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