



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 10

LIFE SCIENCES P1

EXEMPLAR 2012

MARKS: 150

TIME: 2½ hours

This question paper consists of 14 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 all drawn to scale.
9. Do NOT use graph paper.
10. You may use a non-programmable calculator, protractor and 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 1.1.9) in your ANSWER BOOK, for example 1.1.10 D.

1.1.1 Which of the following covers external body surfaces and lines internal cavities?

- A Epithelial tissue
- B Connective tissue
- C Muscular tissue
- D Nervous tissue

1.1.2 The strengthening tissue with a cell wall thickened especially in the corners is called ...

- A collenchyma.
- B phloem.
- C chlorenchyma.
- D sclerenchyma.

1.1.3 Which inorganic compound is most abundant in the bodies of plants and animals?

- A Vitamins
- B Water
- C Proteins
- D Carbohydrates

1.1.4 A division of one cell by mitosis will produce ...

- A two nuclei, each of which has a chromosome number half that of the parent nucleus.
- B four nuclei, each of which has a chromosome number half that of the parent nucleus.
- C two nuclei, each of which has the same number of chromosomes as the parent nucleus.
- D four nuclei, each of which has the same number of chromosomes as the parent nucleus.

1.1.5 The foramen magnum is found in the ...

- A lower limb.
- B skull.
- C spinal column.
- D upper limb.

1.1.6 The growth tip of the root of a plant consists mainly of ...

- A companion cells.
- B epidermal cells.
- C meristematic tissue.
- D conducting tissue.

1.1.7 Which of the following are bones of the lower leg?

- (i) Fibula
- (ii) Ileum
- (iii) Tibia
- (iv) Femur

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

1.1.8 The red pigment in blood that carries oxygen is ...

- A found in the leucocytes.
- B found in the platelets.
- C not found in erythrocytes.
- D known as haemoglobin.

1.1.9 Which of the following are examples of connective tissues?

- (i) Squamous tissue
- (ii) Blood tissue
- (iii) Cuboidal tissue
- (iv) Tendons

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

(9 x 2) **(18)**

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 The light-trapping pigment found in the leaves
- 1.2.2 A movement of gas molecules from a region of higher concentration to a region of lower concentration
- 1.2.3 The growth or tumour that forms as a result of uncontrolled mitosis
- 1.2.4 Most abundant plant tissue with thin cell walls and intercellular spaces
- 1.2.5 The substance which an enzyme acts upon
- 1.2.6 The total number of thoracic vertebrae in the human body
- 1.2.7 A pore in the epidermis of the leaf surrounded by two guard cells
- 1.2.8 The structural unit of the nervous system **(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 1.3.9) in the ANSWER BOOK.

COLUMN I	COLUMN II
1.3.1 The stage in the cell cycle when the cell performs its normal functions	A: Interphase B: Cytokinesis
1.3.2 Responsible for protein synthesis	A: Ribosomes B: Lysosomes
1.3.3 The first vertebra of the human vertebral column	A: Axis B: Atlas
1.3.4 Transports organic food in plants	A: Phloem B: Sieve tubes
1.3.5 Joins the ribs to the sternum	A: Cartilage B: Bone
1.3.6 The waxy layer on the outer surface of leaves	A: Epidermis B: Cuticle
1.3.7 The thin membrane surrounding a muscle fibre	A: Periosteum B: Sarcolemma
1.3.8 Plant cells without nuclei	A: Parenchyma B: Companion cells
1.3.9 Controls slow involuntary movements in the human body	A: Striated muscle tissue B: Smooth muscle tissue

(9 x 2) **(18)**

1.4 Study the following table.

Cell organelle	Function	Found in plants/animals/both
Golgi apparatus	1.4.1	1.4.2
1.4.3	Cellular respiration	1.4.4
Chloroplast	1.4.5	1.4.6

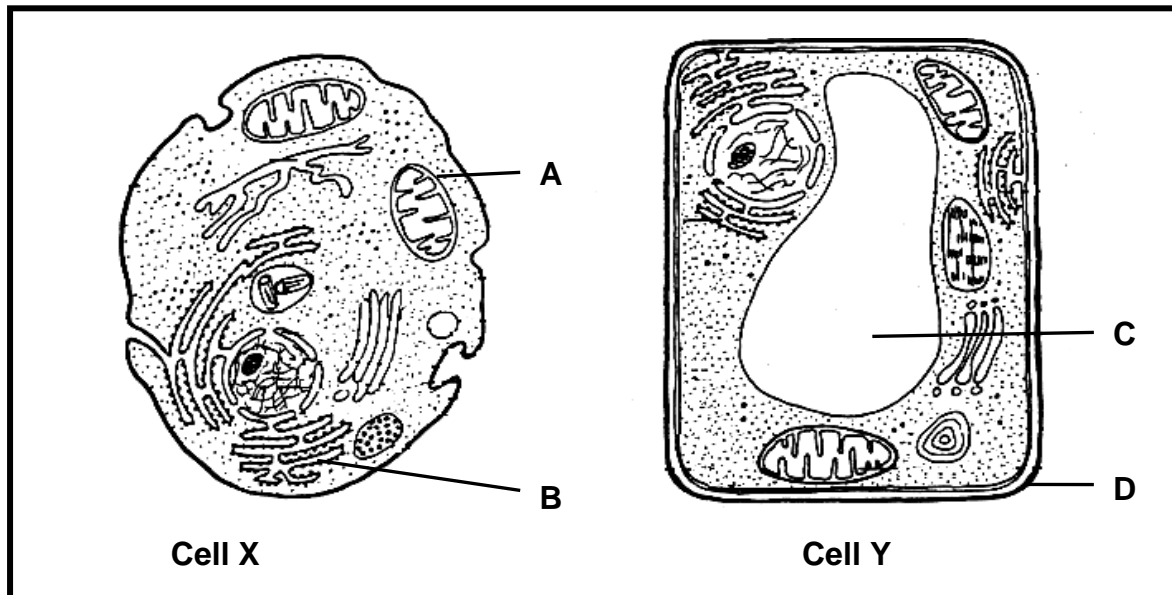
Complete the above table by writing down only the numbers (1.4.1 to 1.4.6) and your answer next to it.

(6)

TOTAL SECTION A: 50

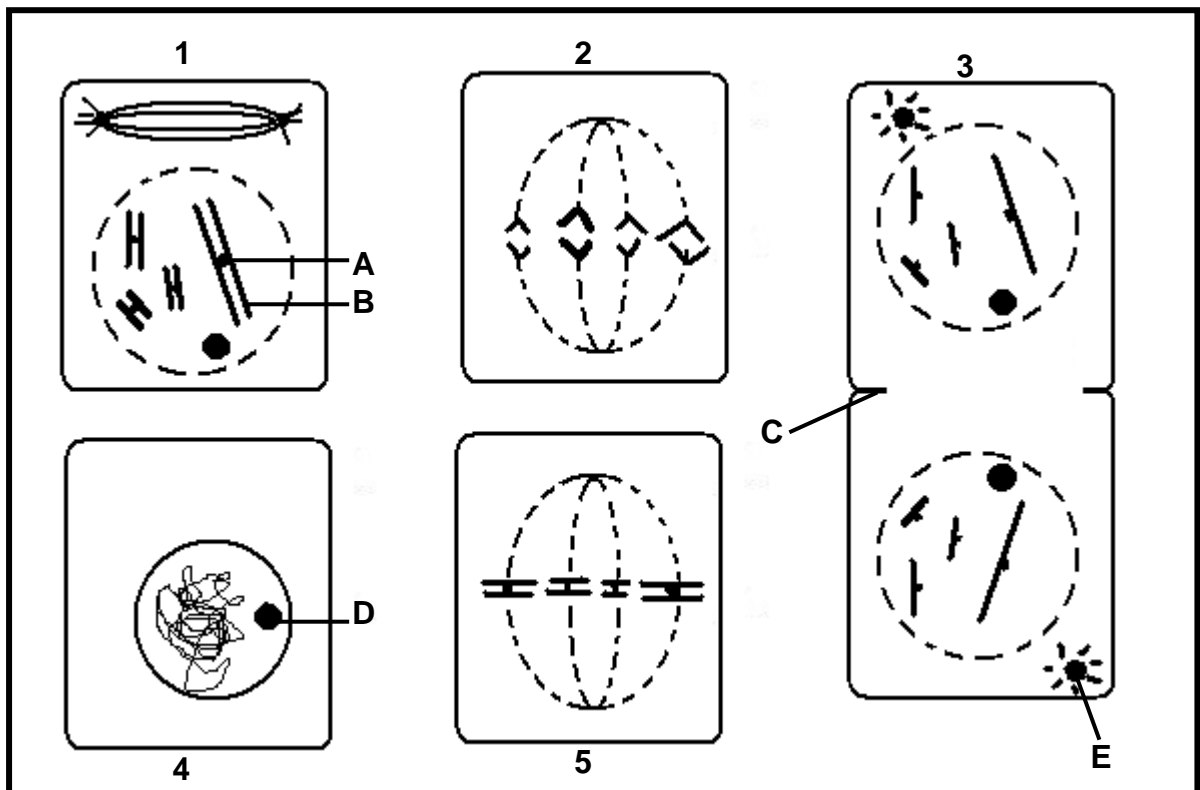
SECTION B**QUESTION 2**

2.1 Study the diagrams below representing two cells with their organelles.



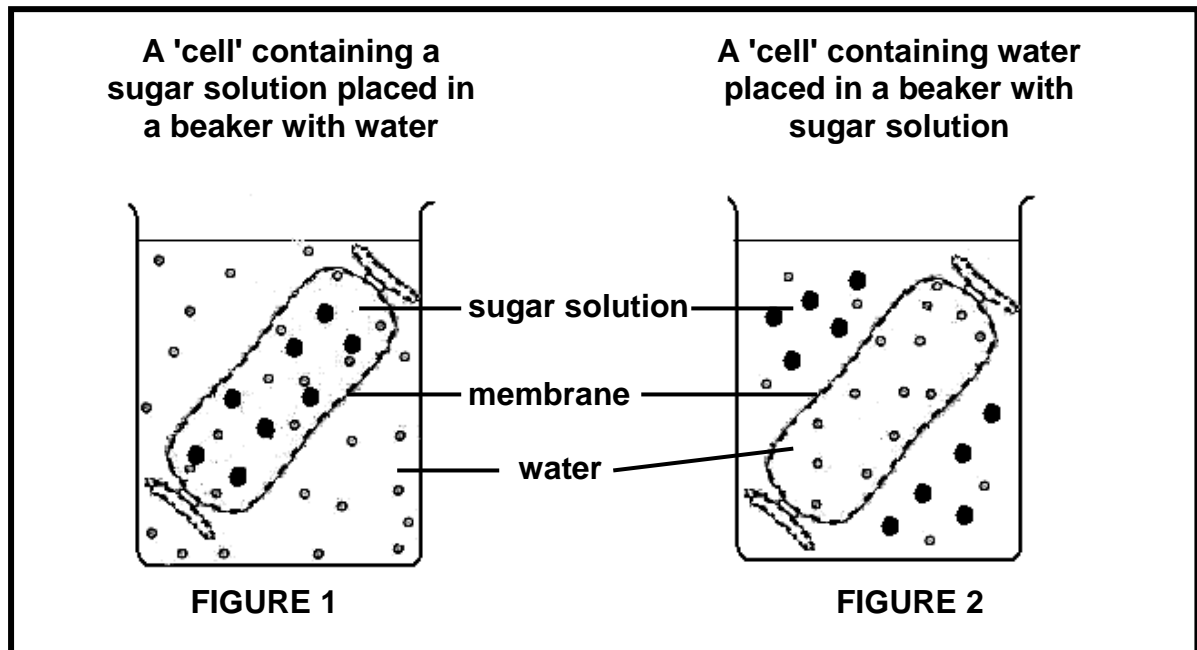
- 2.1.1 Which cell, (**X** or **Y**) represents a plant cell? (1)
- 2.1.2 Give TWO visible reasons for your answer. (2)
- 2.1.3 Label parts **A** and **B**. (2)
- 2.1.4 Structure **C** plays an important role in cell **Y**. List THREE functions of this structure. (3)
- 2.1.5 Name the organic substance that part **D** in cell **Y** mainly consists of. (1)
- (9)**

2.2 Study the diagrams below which represent different phases of mitosis.



- 2.2.1 Label structures **A**, **B**, **D** and **E**. (4)
- 2.2.2 By making use of NUMBERS ONLY, arrange the phases into the correct sequence. (5)
- 2.2.3 Write down the number of chromosomes in a daughter cell at the end of the process shown above. (1)
- 2.2.4 State ONE difference between plant and animal cells with regard to the process taking place at **C**. (2)
- 2.2.5 State TWO reasons why mitosis is a biologically important process. (2)
- (14)**

- 2.3 The diagrams below illustrate a process through a differentially permeable membrane.



- 2.3.1 What is meant by a *differentially permeable membrane*? (2)
- 2.3.2 Describe what happens in FIGURE 2 and explain your answer by indicating in which direction the water moves and why. (4)
- 2.3.3 Which physiological process is represented in FIGURE 2? (1)
- (7)

- 2.4 The table below shows the nutritional value of a certain brand of breakfast cereal. Study the information before answering the questions below.

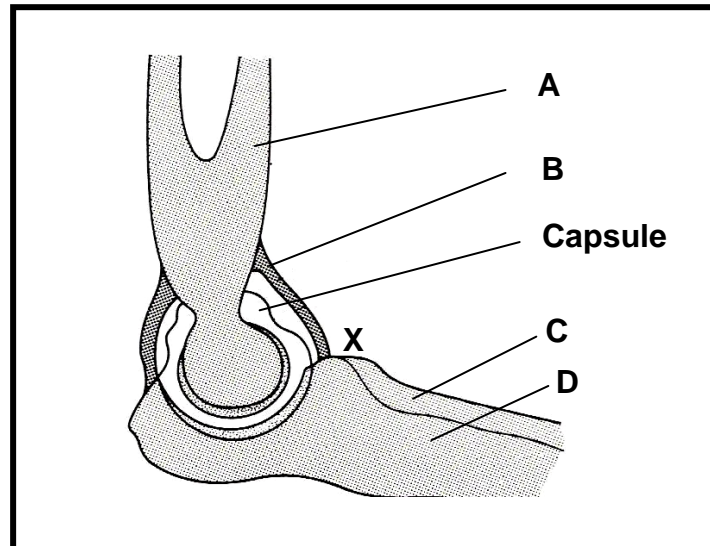
NUTRITIONAL COMPOSITION OF CEREAL

Ingredients	Nutritional Information (Values per 100 g)	
Whole rolled oats, roasted wheat flakes, cane syrup, brown sugar, vegetable oil, sun-dried raisins	Energy	2 000 kJ
	Protein	12,5 g
	Carbohydrates	50 g
	Fats	12,5 g
	Fibre	25 g
	Cholesterol	0 mg

- 2.4.1 Explain ONE advantage of this cereal having no cholesterol. (2)
- 2.4.2 The total energy value of a 100 g cereal is 2 000 kJ. The boy requires 5 500 kJ of energy per day. How many grams (g) of cereal does he need to eat in order to obtain this energy (assuming that he does not eat any other foods)? Show your working. (2)
- 2.4.3 Draw a pie chart to illustrate the relative proportions of protein, carbohydrate, fats and fibre of this 100 g of cereal. (6)
- (10)**
[40]

QUESTION 3

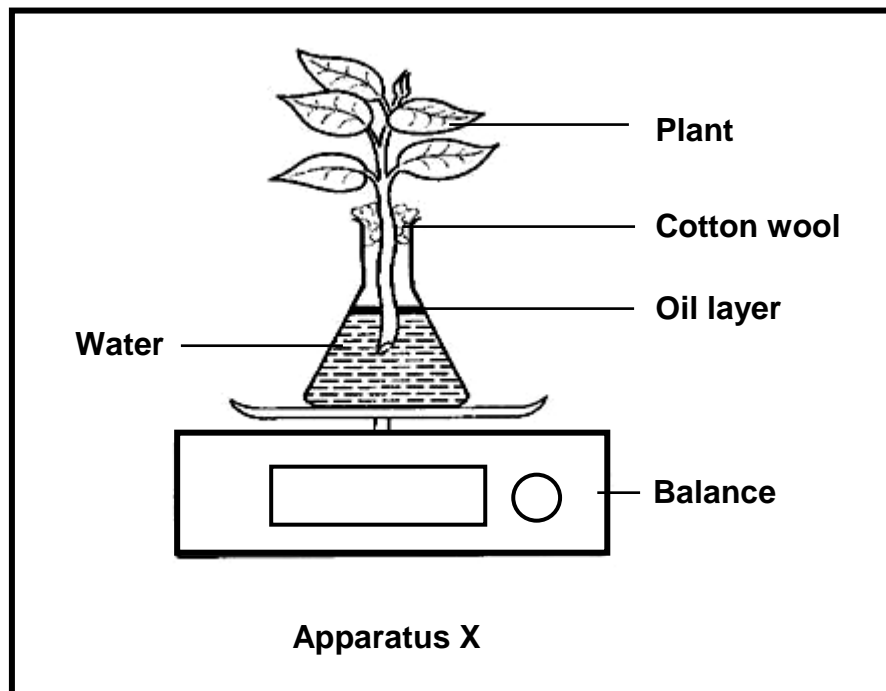
- 3.1 List FOUR functions of the human skeleton. **(4)**
- 3.2 Study the diagram below which shows a section through the arm and elbow joint of a human and answer the questions that follow.



- 3.2.1 Label structures **B**, **C** and **D** respectively. **(3)**
- 3.2.2 Identify the type of synovial joint shown in the diagram. **(1)**
- 3.2.3 State:
- (a) TWO functions of the capsule **(2)**
- (b) ONE function of **B** **(1)**
- 3.2.4 Name the structure that will attach the muscle to the area of the bone marked **X**. **(1)**
- 3.2.5 Make a labelled drawing of a longitudinal section through a long bone. **(6)**
(14)

3.3 An investigation was carried out to study the effect of light intensity on the opening and closing of the stomata.

1. Apparatus X (shown in the diagram below) was used to measure the rate of water loss from the leaves at several light intensities.
2. At each light intensity, the apparatus was left for 15 minutes before starting measurements.
3. The water loss was recorded in the dark and at four different light intensities.



3.3.1 State an hypothesis for this investigation. (3)

The results of this investigation are shown in the table below.

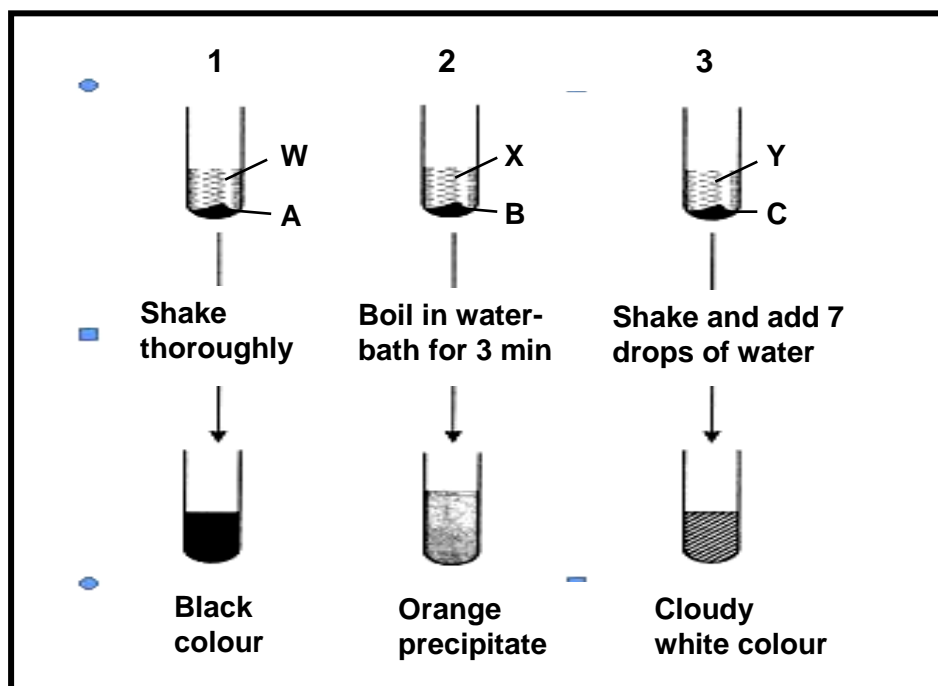
Light intensity (kilolux)	Loss of water (g/hour)
0	1
10	15
20	20
30	22
40	20

3.3.2 State the dependent variable in the above investigation. (1)

3.3.3 What evidence supports the statement that the stomata are fully open at a light intensity of 30 kilolux? (2)

- 3.3.4 What is the purpose of the oil layer over the water surface in the flask? (1)
- 3.3.5 Why is the apparatus left for 15 minutes at each new light intensity before starting the measurements? (2)
- 3.3.6 Predict what would be the effect on the results if the investigation was carried out at a lower temperature. (1)
- 3.3.7 Account for your prediction in QUESTION 3.3.6. (2)
- 3.3.8 Describe ONE way in which the reliability of the results obtained at each light intensity could have been improved. (2)
- (14)**

3.4 The diagram below shows how three different food tests (1, 2 and 3) were carried out. **A**, **B** and **C** indicate the food sample and **W**, **X** and **Y** the reagent that was added to the food sample. Each gave a positive result.



- 3.4.1 Identify reagents **W**, **X** and **Y** respectively. (3)
- 3.4.2 Give the names of the nutrients tested for in food samples **1**, **2** and **3**. (3)
- 3.4.3 State the colour you would have seen if the results were negative in:
- (a) Test 1 (1)
- (b) Test 2 (1)
- (8)**
[40]

TOTAL SECTION B: 80

SECTION C**QUESTION 4**

Describe the absorption of water by a root hair of a plant as well as the lateral movement of the absorbed water from the root hair to the xylem of the root. Also explain the different ways in which the xylem is structurally suited to transport water upwards in plants.

Content: (17)
Synthesis: (3)

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

TOTAL SECTION C: 20
GRAND TOTAL: 150