education

Department:
Education
PROVINCE OF KWAZULU-NATAL

NATIONAL SENIOR CERTIFICATE

GRADE 10

LIFE SCIENCES

COMMON TEST

MARCH 2019

MARKS: 60

TIME: 1 hour

This question paper consists of 8 pages.

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. Answer ALL the questions.
2. Write ALL the answers in the 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. 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.
11. Write neatly and legibly.

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SECTION A

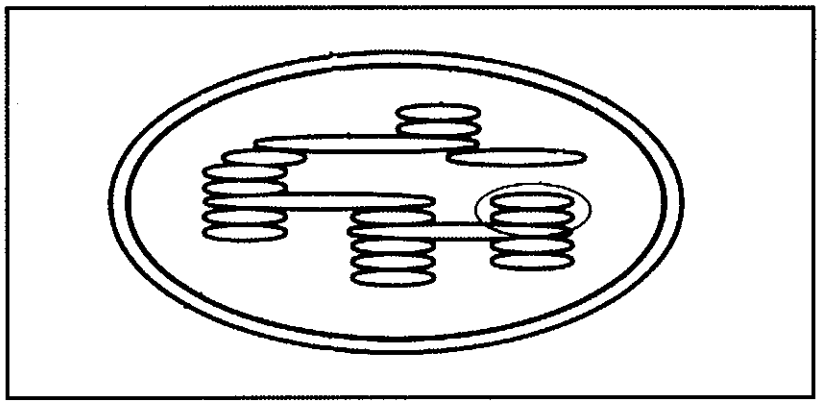
QUESTION 1

1.1 Various options are provided as possible answers to the following questions. Choose the answer and write only the letter (A to D) next to the question number (1.1.1 to 1.1.3) in the ANSWER BOOK, for example 1.1.4 A.

1.1.1 Which chemical reagent is used to test for the presence of fats in a food sample?

A Alcohol
B Iodine solution
C Millon's reagent/Biuret solution
D Benedict's solution/Fehlings A and B

1.1.2 The diagram below represents an organelle of a plant cell.



What would happen if the organelle above is removed from the plant cell?

A There will be no synthesis of proteins.
B The cell will be able to manufacture food.
C There will be no photosynthesis.
D The cell will fail to produce digestive enzymes.

1.1.3 The phenomenon that may lead to death of aquatic organisms as a result of oxygen depletion in a river.

A Eutrophication
B Photosynthesis
C Respiration
D Dehydration

(3 x 2) **(6)**

1.2 Indicate whether each of the descriptions 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 (1.2.1 to 1.2.2) in the ANSWER BOOK.

	COLUMN I	COLUMN II
1.2.1	Facilitates transport of molecules	A Lysosome B Endoplasmic reticulum
1.2.2	Diseases caused by abnormal and uncontrolled cell division	A Cancer B Scurvy

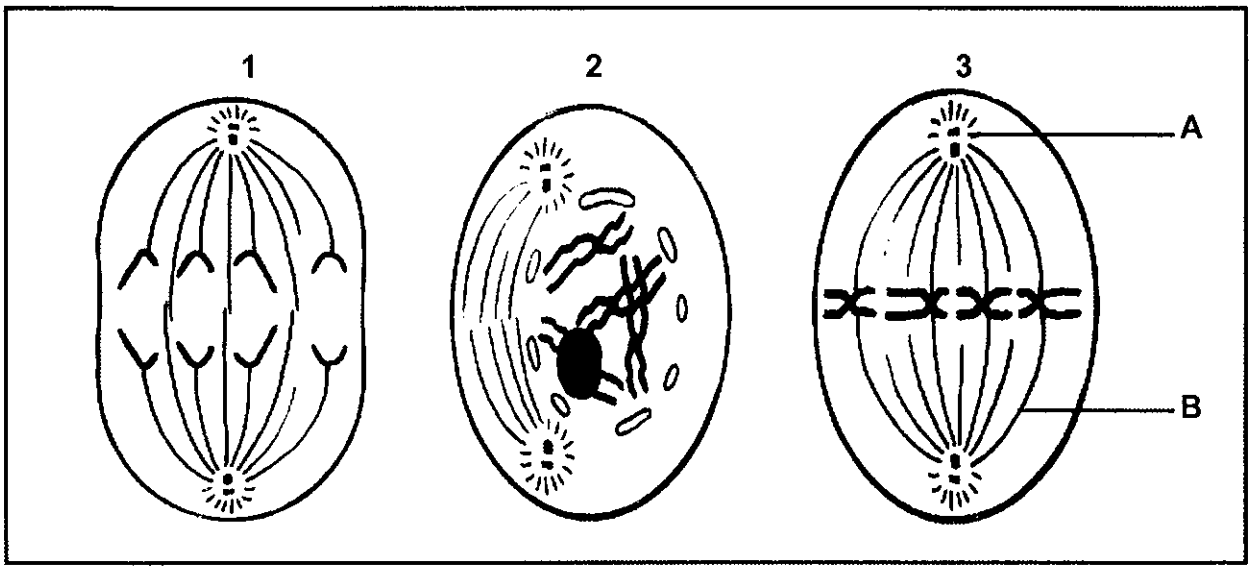
(2 x 2) **(4)**

TOTAL SECTION A: 10

SECTION B

QUESTION 2

2.1 The diagrams below represent the phases of mitosis.



2.1.1 Identify labels:

(a) **A** (1)

(b) **B** (1)

2.1.2 Which phase of mitosis is represented by diagram **1** above? (1)

2.1.3 Give a reason for your answer to QUESTION 2.1.2 (2)

2.1.4 Write down the numbers of the diagrams to show the correct sequence in which the phases occur. (2)

2.1.5 Draw a diagram to show ONE of the cells that would be formed at the end of telophase. (labels are not required) (2)

2.1.6 Define *DNA replication.* (1)
(10)

2.2 The following is the list of characteristics and the functions of plant and animal cells.

A	Has a cell wall
B	Surrounded by cell membrane only
C	Has a regular shape
D	Synthesis of proteins
E	Has a secretory function
F	Stores water/cell sap

Write the LETTER only that applies to each of the following:

2.2.1 ONE Function related to the ribosome. (1)

2.2.2 TWO characteristics related to the plant cells. (2)

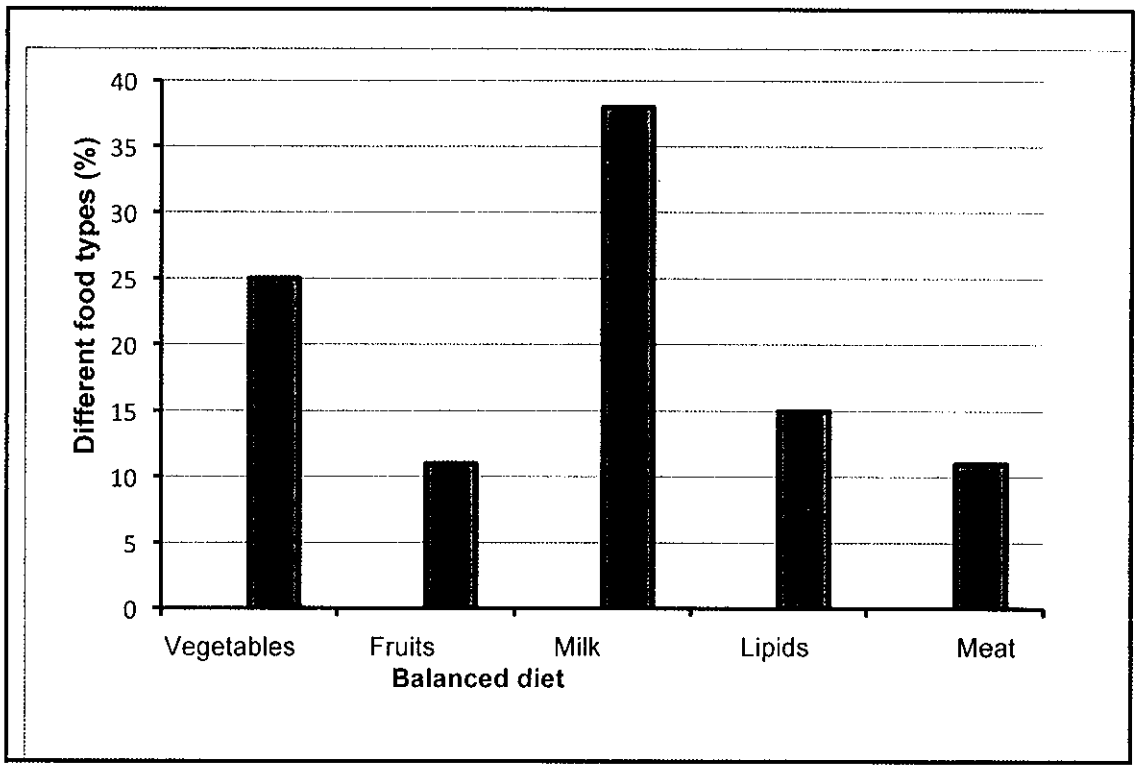
2.2.3 ONE function related to the vacuole. (1)

2.2.4 ONE function related to the Golgi body. (1)
(5)
[15]

QUESTION 3

3.1 An investigation was carried out to determine the percentage of different food types on a balanced diet.

The graph below shows the results of the investigation.



3.1.1 For this investigation identify the:

(a) Dependent variable (1)

(b) Independent variable (1)

3.1.2 Name TWO food types from the graph above that have the equal percentage in a balanced diet (2)

3.1.3 State TWO ways in which the reliability of the investigation can be increased. (2)

3.1.4 Calculate the percentage difference between the vegetables and lipids in a balanced diet. Show your working. (2)

3.1.5 Provide a caption for the graph above. (2)

3.1.6 Name ONE monomer of lipids. (1)
(11)

3.2 Read the extract below.

> The nucleus and the mitochondrion are the organelles found in eukaryotic cells. The nucleus contains the cells genetic material. This material is organised as DNA molecules.
>
> The nucleus has vital important functions in the plant and the animal cells.

3.2.1 State what would happen if the **nucleus** and the **mitochondria** are removed from the cell. **(4)**

[15]

TOTAL SECTION B: 30

SECTION C

QUESTION 4

Various types of proteins play a vital role in plants and animal cells. Liquid and gas enter or leave these cells in different ways. These cells divide to form new cells for growth and repairs.

Provide a description for each of the following:

1. The 'lock and key' theory of enzymes.
2. Methods by which water moves through a cell membrane.
3. Prophase of mitosis.

Content: (17)
Synthesis: (3)
(20)

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

TOTAL SECTION C: 20

GRAND TOTAL: 60

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MEMORANDUM

MARKS: 60

This memorandum consists of 4 pages.

SECTION A

QUESTION 1

1.1 1.1.1 B✓✓
1.1.2 C✓✓
1.1.3 A✓✓

(3 x 2) **(6)**

1.2 1.2.1 B✓✓
1.2.2 A✓✓

(2 x 2) **(4)**

TOTAL SECTION A: 10

SECTION B

QUESTION 2

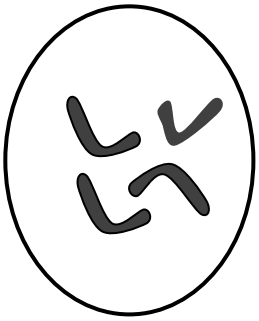
2.1 2.1.1 (a) Centriole✓ (1)
(b) Spindle fibre✓ (1)

2.1.2 Anaphase✓ (1)

2.1.3 Chromatids are pulled to opposite poles✓✓/chromosomes split into chromatids (2)

2.1.4 2 - 3 - 1✓✓ (2)

2.1.5



Criteria for marking

Cell contains single strands chromosomes	1 mark
Cell contains 4 single strands chromosomes	1 mark

(2)

2.1.6 Process whereby DNA makes an identical copy of itself✓ (1)
(10)

2.2	2.2.1	D✓		(1)
	2.2.2	- A✓ - C✓		(2)
	2.2.3	F✓		(1)
	2.2.4	E✓		(1) **(5)** **[15]**

QUESTION 3

3.1	3.1.1	(a) Percentage of different food types✓			(1)
		(b) Balanced diet✓			(1)
	3.1.2	- Fruits✓ - Meat✓			(2)
	3.1.3	- Repeat the investigation✓ - Increase the food types in a diet✓/and calculate the average			(2)
	3.1.4	25% - 15%✓ = 10%✓			(2)
	3.1.5	The percentage of different food types on a balanced diet✓✓			(2)
	3.1.6	- Fatty acids✓ - Glycerol✓	Any		(1) **(11)**
3.2	3.2.1	**Nucleus removed** - Cell may die✓ - No control of cell activities✓ - No transmission of hereditary characteristics✓ - No protein synthesis✓	Any	2	
		Mitochondria removed - No cellular respiration✓ - No energy will be produced✓ - No life functions✓/activities	Any	2	**(4)** **[15]**

TOTAL SECTION B: 30

SECTION C
QUESTION 4

The 'lock and key' theory of enzyme action
- Enzyme is specific with regard to the reaction it catalyse✓
- Active enzyme has a specific shape✓
- Substrate on which enzyme works fits into the enzyme✓
- That allows a specific enzyme to bind with a specific substrate✓
- to form an enzyme-substrate complex✓
- The enzyme-substrate is compared to a lock and key✓
- The substrate is broken down✓
- Enzyme and products are split✓
- The enzyme remain unchanged✓ Any (6)

Movement of liquid and gas through a membrane

Diffusion✓*
- Liquid and gas molecules move from higher to lower concentration✓

Osmosis✓*
- Water molecules move from dilute solution to a concentrated solution✓
- through a differentially permeable membrane✓

Active transport✓*/absorption
- Liquid and gas molecules move against a concentration gradient✓
- using energy✓

3* compulsory marks + Any other 3 (6)

Prophase
- The chromatin material unwinds✓
- It become visible as chromosomes✓
- Each chromosome consists of two chromatids✓
- joined by a centromere✓
- nuclear membrane and nucleolus disappear✓
- In animal cells the centrioles separate/move to opposite poles✓
- The centrioles form the spindle fibres✓ Any (5)

(17)
(3)
(20)

ASSESSING THE PRESENTATION OF THE ESSAY

Relevance	Logic sequence	Comprehensive
All information provided is relevant to the question	Ideas arranged in a logical cause-effect sequence	Answered all aspects required by the essay in sufficient detail
All the information provided is relevant to the: - 'lock and key' - Movement of liquid and gas - Prophase	All the information regarding the: - 'lock and key' - Movement of liquid and gas - Prophase	At least the following points should be included: - 'lock and key' 4/6 - Movement of liquid and gas 4/6 - Prophase 3/5
1 mark	**1 mark**	**1 mark**

TOTAL SECTION C: **20**

GRAND TOTAL: **60**