Education

KwaZulu-Natal Department of Education

NATIONAL SENIOR CERTIFICATE

GRADE 10

LIFE SCIENCES

PROVINCIAL COMMON TEST

MARCH 2020

MARKS: 60

TIME: 1 hour

This question paper consists of 9 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.

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 D.

1.1.1 Which ONE of the following is INCORRECT about functions of mitosis?

A Repairs damaged tissues
B Replaces dead cells
C Halves number of chromosomes
D Promotes growth

1.1.2 The organelles that synthesise proteins are called …

A ribosomes.
B mitochondria.
C chloroplasts.
D nucleoli.

1.1.3 When viewing a specimen, the total magnification is 400x. If the magnification on the eyepiece is 10x then the magnification on the objective lens is …

A 4x.
B 40x.
C 200x.
D 400x.

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

1.2 Give a correct **biological term** for each of the descriptions below.

1.2.1 Yellowing of leaves due to lack of chlorophyll.

1.2.2 A carbohydrate that forms part of cell wall.

1.2.3 The movement of gas molecules from a region of high concentration to a region of low concentration.

1.2.4 A bone disease that affects children because of a lack of vitamin D In their diets.

1.2.5 The element needed in a diet in order to prevent anaemia.

(5 x 1) **(5)**

1.3 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 (1.3.1 to 1.3.3) in the ANSWER BOOK.

	COLUMN I	**COLUMN II**
1.3.1	DNA replication takes place	A: Prophase B: Telophase
1.3.2	A macro-nutrient that keeps bones and teeth strong	A: Potassium B: Calcium
1.3.3	Element present in proteins but not in carbohydrates	A: Carbon B: Nitrogen

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

1.4 Study the table below showing the results of different food tests.

FOOD TYPE	**BENEDICT'S TEST**	**IODINE SOLUTION TEST**
X	Blue	Blue -black
Y	Orange	Blue-black
Z	Orange	Brown

1.4.1 Which ONE of the following food types (**X**, **Y** and **Z**) contains:

(a) Starch only? (1)

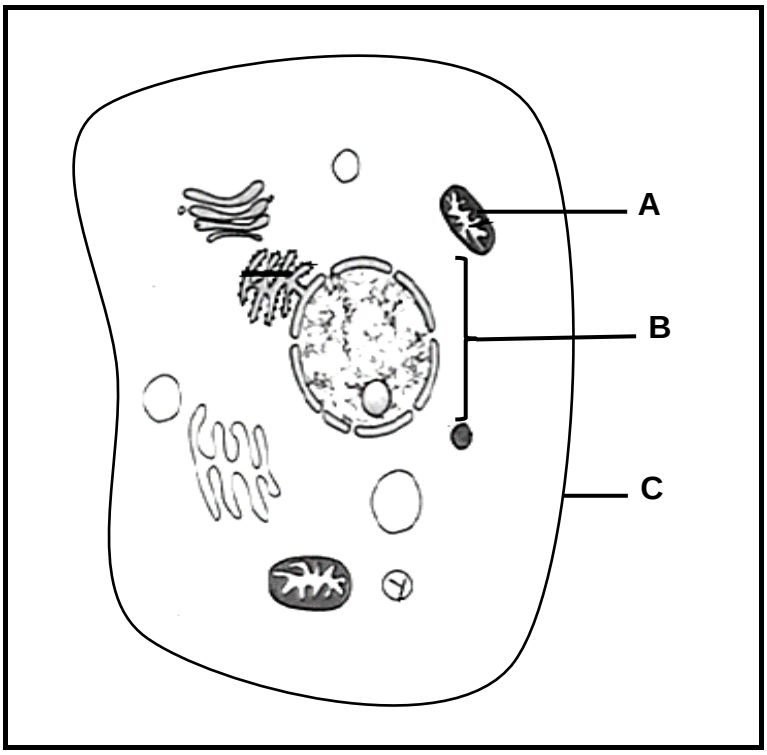
(b) Glucose only? (1)

(c) Glucose and starch? (1)
(3)

SECTION B

QUESTION 2

2.1 Study the diagram of a cell below.



2.1.1 Is this a diagram of a plant or animal cell? (1)

2.1.2 Give THREE reasons for your answer in QUESTION 2.1.1 (3)

2.1.3 Identify part:

(a) **A** (1)

(b) **B** (1)

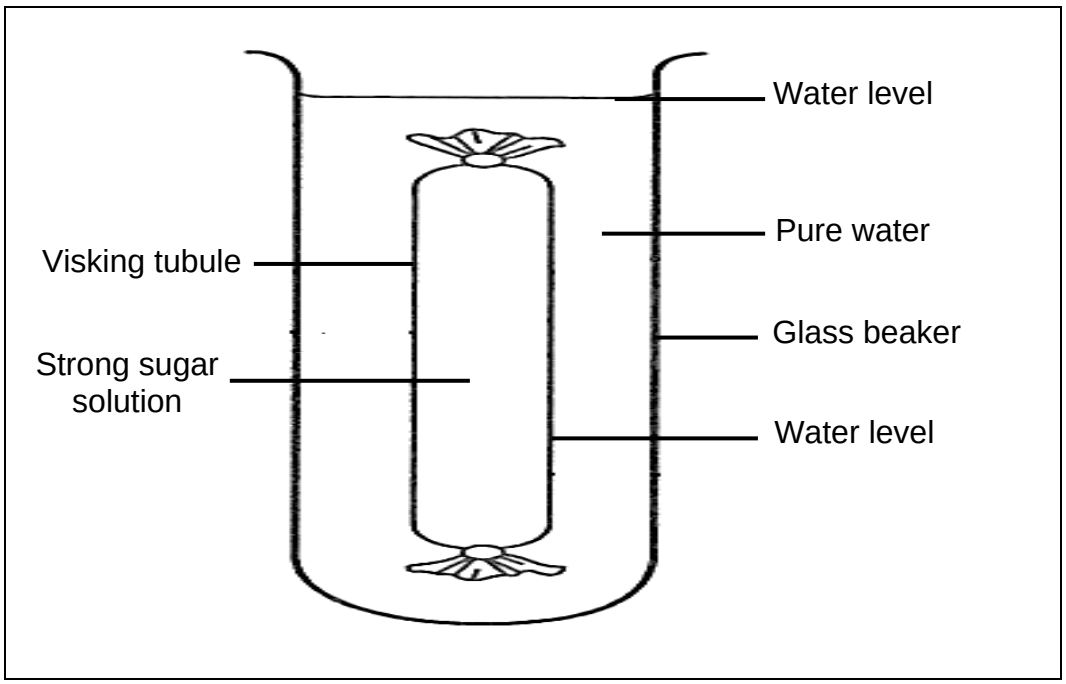
2.1.4 State ONE function of part **A**. (1)

2.1.5 Explain what would happen to a cell if part **C** becomes impermeable. (2)
(9)

2.2 Grade 10 learners set up the apparatus below in the school laboratory using visking tubing. (visking tubing allows water to move in and out like the cell membrane of the cell).

The learners:

- Recorded the level of the water in the beaker before the start of investigation.
- After 2 hours there was a change in the level of water in the glass beaker and the solution in the visking tubing.

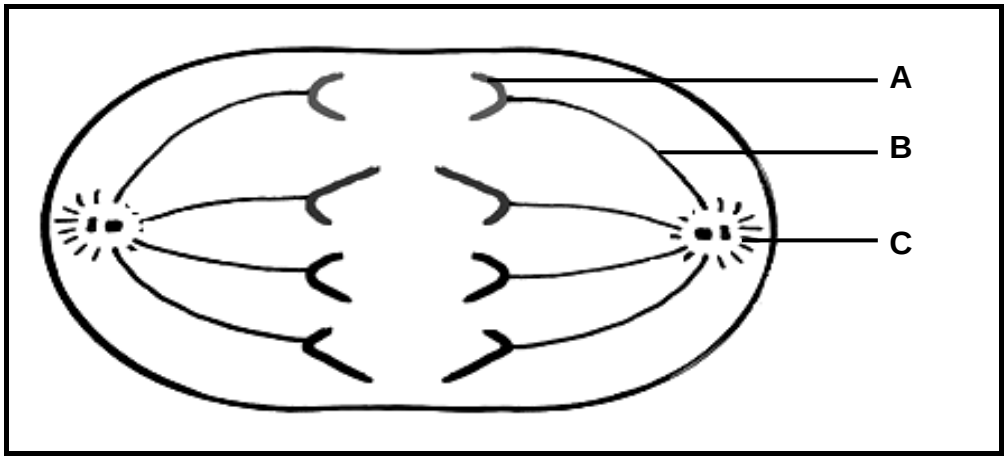


2.2.1 State the process that is investigated in the diagrams above. (1)

2.2.2 Explain the changes that were observed in the level of the strong sugar solution in the visking tubing and the pure water in the glass beaker. (4)

(5)

2.3 Study the diagram below showing a phase during mitosis.



2.3.1 Describe the events that take place in the phase which occurs before the one shown above. (2)

2.3.2 Give the LETTER and NAME of the part that contains genetic material. (2)

2.3.3 How many chromosomes:

(a) Will be present in the daughter cells at the end of mitosis? (1)

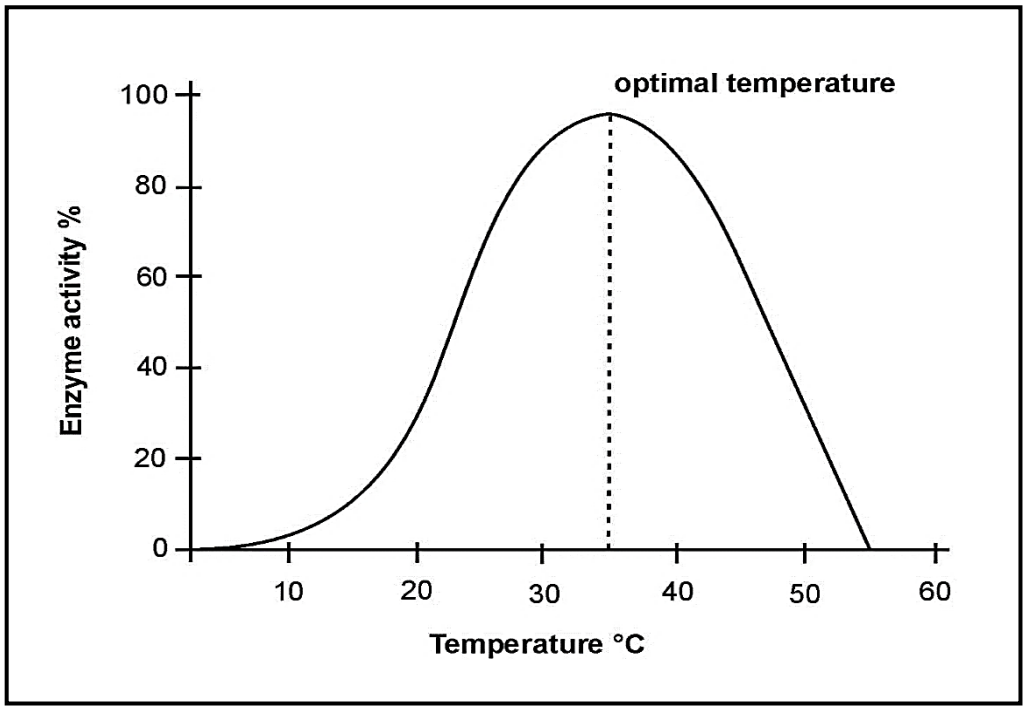
(b) Were present in the cell before mitosis began? (1)
(6)

[20]

QUESTION 3

3.1 An investigation was carried out to determine the effect of temperature on enzyme activity.

The results of the investigation are shown in the graph below.



3.1.1 What was the aim of the investigation? (1)

3.1.2 Identify the:

(a) Dependent variable (1)

(b) Independent variable (1)

3.1.3 Name TWO planning steps that were taken in this investigation. (2)

3.1.4 Explain why the enzyme activity decreases when the temperature is above 40°C. (2)

3.1.5 Using the information in the graph, state the temperature when the enzyme activity is at 60%. (1)

3.1.6 Write down the conclusion of the above investigation? (2)
(10)

3.2 The table below shows nutritional information on three cereal packets **A**, **B** and **C**. Each packet has a mass of 500g

A 15-year old boy showed the following symptoms after eating one serving of cereal **B**.

- Bleeding gums
- Nosebleed
- Sores on the skin

NUTRIENT	CEREAL A	CEREAL B	CEREAL C
Protein (g)	2	9	1
Vitamin C (g)	35	30	60
Sodium (g)	200	270	135
Fats (g)	7	36	18

3.2.1 Name the monomers of protein. (1)

3.2.2 Using the list of symptoms mentioned above, name a deficiency disease that the boy is suffering from. (1)

3.2.3 Calculate the percentage of vitamin C in cereal B. (2)

3.2.4 Which cereal (**A**, **B** or **C**) will be LEAST suitable to the boy? (1)

3.2.5 Give ONE reason for your answer to QUESTION 3.2.4 (1)

(6)

3.3 Farmers use fertilisers to promote plant growth.

Explain the effects of excessive use of fertilisers. **(4)**

(20)

TOTAL SECTION B: 40

GRAND TOTAL: 60

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MARKING GUIDELINE

MARKS: 60

This marking guideline consists of 4 pages.

SECTION A

QUESTION 1

1.1	1.1.1	C✓✓		
	1.1.2	A✓✓		
	1.1.3	B✓✓	(3 x 2)	**(6)**
1.2	1.2.1	Chlorosis✓		
	1.2.2	Cellulose✓		
	1.2.3	Diffusion✓		
	1.2.4	Rickets✓/Osteomalacia		
	1.2.5	Iron✓		
			(5 x 1)	**(5)**
1.3	1.3.1	None✓✓		
	1.3.2	B only✓✓		
	1.3.3	B only✓✓		
			(2 x 3)	**(6)**
1.4	1.4.1	(a) **X**✓		(1)
		(b) **Z**✓		(1)
		(c) **Y**✓		(1)
				(3)

TOTAL SECTION A: 20

SECTION B

2.1	2.1.1	Animal cell✓		(1)
	2.1.2	- No cell wall✓ - Small/no vacuole✓ - No pigments✓/ No chloroplast(any other pigment) - Has centrosome✓ **(Mark first THREE only)**	Any	(3)
	2.1.3	(a) Mitochondrion✓		(1)
		(b) Nucleus✓		(1)
	2.1.4	Cellular respiration✓/produce energy **(Mark first ONE only)**		(1)
	2.1.5	- Substances will not be able to pass through✓ - resulting in the death of a cell✓		(2)
				(9)

2.2 (1)

2.2.1 Osmosis✓

2.2.2 (a) - rise in the level of sugar solution✓
-and decrease in water level in the beaker✓
- due to water molecules moving from the beaker to visking tubing
- from a region of high concentration✓/beaker
- to low concentration✓/solution in visking tubing (4)
- Through visking tubing ✓/semi permeable membrane

Any 4 **(5)**

2.3 2.3.1 - Spindle fibres attach to the centromere✓
- Chromosomes are arranged at the centre of the cell✓ (2)

2.3.2 A ✓ - chromosome✓(chromatid) (2)

2.3.3 (a) 4✓ (1)
(b) 4✓ (1)

(6)

TOTAL 20

QUESTION 3

3.1	3.1.1	To determine the effect of temperature on enzyme activity✓	(1)
	3.1.2	(a) Enzyme activity✓	(1)
		(b) Temperature✓	(1)
	3.1.3	- Ask permission - Decide on method to record results✓ - Decide on materials to use during investigation✓ - Decide on the venue - Decide on the time of the investigation✓ Any 2	(2)
	3.1.4	- Enzymes start denaturing✓ - when optimum temperature is exceeded✓	(1)
	3.1.5	22 - 25^0C✓	
	3.1.6	Enzymes work best at an optimal temperature ✓✓	(2)
			(10)
3.2	3.2.1	Amino acids✓	(1)
	3.2.2	Scurvy✓	(1)
	3.2.3	$\frac{30}{345}$ ✓ x100% = 8.7%✓	(2)
	3.2.4	B✓	(1)
	3.2.5	Cereal B has least amount of vitamin C✓✓	(1)
			(6)
3.3		- Leads to eutrophication✓ - resulting in rapid growth of algae✓ and other aquatic plants - Algae prevents sunlight✓ - from reaching plants growing in deeper water✓ - Prevents photosynthesis✓ of other water plants - Plants will die✓ and rot - Decomposition bacteria reduce oxygen in water✓ - Aquatic animals die Any 4	**(4)**

TOTAL: 20

GRAND TOTAL: 60