education

Department of Education
FREE STATE PROVINCE

GRADE 10

LIFE SCIENCES

FORMAL TEST 2.1

MARCH 2025

TOTAL: 50

TIME: 50 minutes

This question paper consists of 7 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. Make 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 must use a non-programmable calculator, protractor, and a compass, where necessary.
11. Write neatly and legibly.

SECTION A

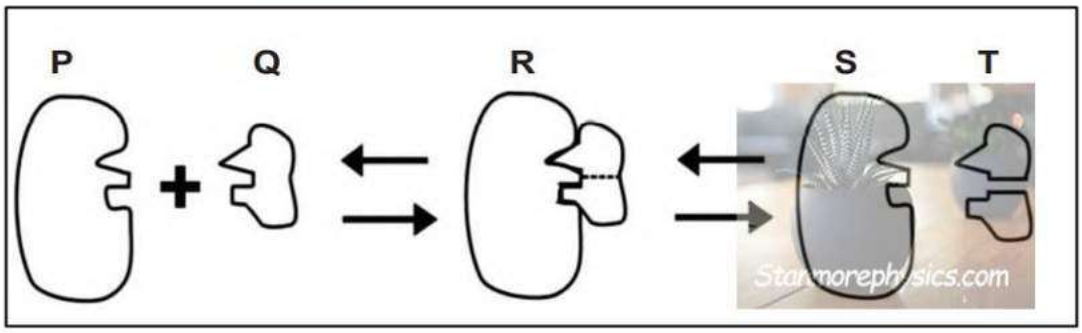
QUESTION 1

1.1 Various options are given 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 1.1.5) in the ANSWER BOOK, for example 1.1.6 D.

1.1.1 A Dutch scientist who designed the first microscope and is regarded as the father of microscopy.

A Rudolf Virchow
B Antonie van Leeuwenhoek
C Robert Hooke
D Matthias Schleiden

1.1.2 The diagram below shows enzyme action.



What does **Q** represent in the diagram above?

A An enzyme
B Enzyme- substrate complex
C A product
D Substrate

1.1.3 The most important function of the cell wall in a plant cell, is to…

A prevent dehydration.
B allow certain molecules to pass through.
C keep unwanted solutions outside the cell.
D produce lignin to support the cell.

1.1.4 Which inorganic compound is most abundant in healthy bodies of plants and animals?

A Vitamins
B Water
C Proteins
D Carbohydrates

1.1.5 The dark coloured body in the nucleoplasm of the nucleus.

A Nucleus
B Golgi - apparatus
C Ribosome
D Nucleolus

(5 x 2) **(10)**

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 1.2.4) in the ANSWER BOOK.

1.2.1 Part of the microscope that concentrates light rays from the light source onto the specimen

1.2.2 Deficiency caused by lack of iodine in humans

1.2.3 Organic compounds made up of the elements C, H, O and N

1.2.4 Fats mainly derived from plants, that are liquids at room temperature

(4 x 1) **(4)**

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	Nutrients needed in small quantities	A: Macro - elements B: Micro - elements
1.3.2	Controls all cell activities.	A: Cytoplasm B: Nucleus
1.3.3	Spontaneous movement of gas molecules from an area of high concentration to an area of low concentration until equilibrium is reached	A: Diffusion B: Osmosis

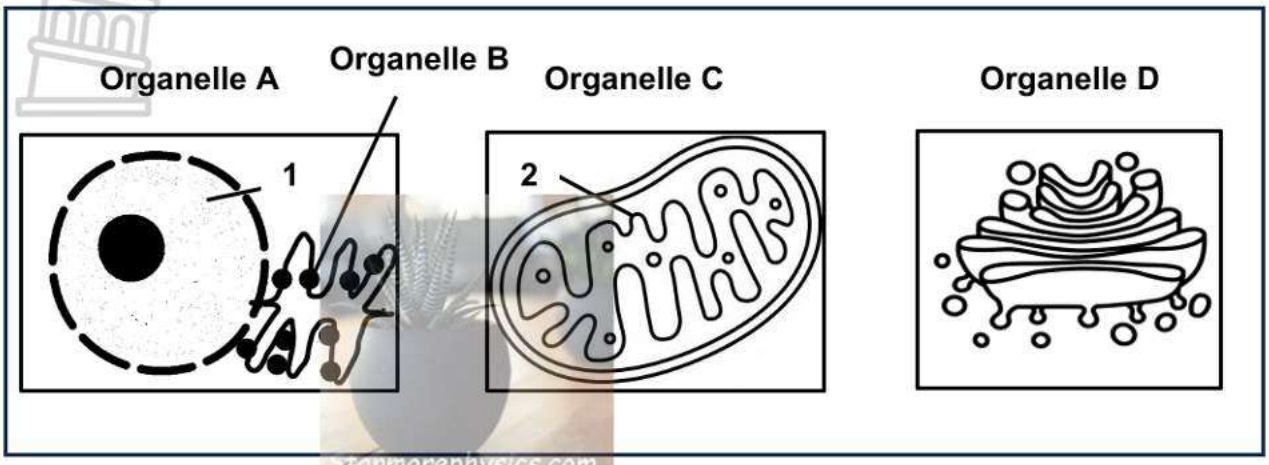
(3 x 2) **(6)**

TOTAL SECTION A: 20

SECTION B

QUESTION 2

2.1 The diagrams below represent different organelles in a cell.



2.1.1 Give the LETTER and NAME of the organelle:

(a) Where protein synthesis takes place (2)

(b) That produces mucus (2)

(c) Which contains chromatin network (2)

2.1.2 Identify part:

(a) **1** (1)

(b) **2** (1)

2.1.3 Give TWO functions of the endoplasmic reticulum in organelle **A.** (2)

2.1.4 Describe the process that occurs in organelle **C**. (2)

2.1.5 Describe the structure of cell membranes that allows selective/differential permeability. (3)
(15)

QUESTION 3

3.1 A learner carried out three food tests on samples of peanuts, apples and potatoes. The following table shows the results. On the table, a tick (✓) shows a positive result and a cross (**X**) shows a negative result

TEST	REAGENT	PEANUTS	APPLES	POTATOES
P	Iodine solution	✓	**X**	✓
Q	Fehling's A and B OR Benedict's solution	**X**	✓	**X**
R	Ether OR alcohol	✓	**X**	**X**

3.1.1 Name ONE organic nutrient present in:

(a) Peanuts (1)

(b) Apples (1)

3.1.2 During which test (**P**, **Q** or **R**) is it necessary to heat the contents of the test tube to increase the reaction rate? (1)

3.1.3 If a protein test was done on peanuts:

(a) Name the reagent used for the test (1)

(b) Give the colour change observed if the test is positive (2)

(6)

3.2 Rennin is an enzyme found in the stomachs of mammals, and its function is to solidify milk. An investigation was conducted to determine the effect of temperature on the enzyme activity of rennin.

These steps were followed:

- 3 Test tubes, each with a volume of 10 cm^3, were numbered from 1 to 3.
- A visible mark was made 2 cm from the bottom of each test tube, and each tube was filled with milk up to the 2 cm mark.
- 3 ml of rennin was added to each test tube, and the tubes were kept for 15 minutes at different temperatures.
- Test tube 1: 10°C
- Test tube 2: 37°C
- Test tube 3: 50°C

The presence of a reaction was indicated by the milk becoming solid. Enzyme activity was measured in reactions per second.

The results are shown in the table below

TEST TUBE	TEMPERATURE/ ^0C	ENZYME ACTIVITY/ SECOND(S)
1	10	5
2	37	25
3	50	10

3.2.1 Identify the independent variable. (1)

3.2.2 Give TWO ways how they ensured the validity of this experiment. (2)

3.2.3 Draw a line graph to represent the enzyme activity at different temperatures. (6)

(9)

TOTAL QUESTION 3 15

TOTAL SECTION B 30

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GRADE 10

LIFE SCIENCES

FORMAL TEST 2.1

MARCH 2025

MARKING GUIDELINES

TOTAL: 50

TIME: 1 hour

This marking guideline consists of 6 pages

PRINCIPLES RELATED TO MARKING LIFE SCIENCES

1. **If more information than marks allocated is given**
   Stop marking when maximum marks are reached and put a wavy line and 'max' in the right-hand margin.

2. **If, for example, three reasons are required and five are given**
   Mark the first three irrespective of whether all or some are correct/ incorrect.

3. **If whole process is given when only a part of it is required**
   Read all and credit the relevant part.

4. **If comparisons are asked for but descriptions are given**
   Accept if the differences/similarities are clear.

5. **If tabulation is required but paragraphs are given**
   Candidates will lose marks for not tabulating.

6. **If diagrams are given with annotations when descriptions are required**
   Candidates will lose marks.

7. **If flow charts are given instead of descriptions**
   Candidates will lose marks.

8. **If sequence is muddled and links do not make sense**
   Where sequence and links are correct, credit. Where sequence and links are incorrect, do not credit. If sequence and links become correct again, resume credit.

9. **Non-recognised abbreviations**
   Accept if first defined in answer. If not defined, do not credit the unrecognised abbreviation But credit the rest of the answer if correct.

10. **Wrong numbering**
    If answer fits into the correct sequence of questions but the wrong number is given, it is acceptable.

11. **If language used changes the intended meaning**
    Do not accept.

12. **Spelling errors**
    If recognisable, accept the answer, provided it does not mean something else in Life Sciences or if it is out of context.

13. **If common names are given in terminology**
    Accept, provided it was accepted at the national memo discussion meeting.

14. **If only the letter is asked for but only the name is given (and vice versa)**
    Do not credit.

15. **If units are not given in measurements**
Candidates will lose marks. Memorandum will allocate marks for units separately.

16. **Be sensitive to the sense of an answer, which may be stated in a different way.**

17. **Caption**
All illustrations (diagrams, graphs, tables, etc.) must have a caption.

18. **Code-switching of official languages (terms and concepts)**
A single word or two that appear(s) in any official language other than the learners' assessment language used to the greatest extent in his/her answers should be credited if it is correct. A marker that is proficient in the relevant official language should be consulted. This is applicable to all official languages.

19. **Changes to memorandum**
No changes should be applied to the memorandum. The provincial internal moderator must be consulted.

SECTION A

QUESTION 1

1.1	1.1.1	B✓✓		
	1.1.2	D✓✓		
	1.1.3	D✓✓		
	1.1.4	B✓✓		
	1.1.5	D✓✓	(2x5)	**(10)**
1.2	1.2.1	Condenser✓/ diaphragm		
	1.2.2	Goitre✓		
	1.2.3	Proteins ✓		
	1.2.4	Unsaturated fats✓	(4 x 1)	**(4)**
1.3	1.3.1	B only✓✓		
	1.3.2	B only✓✓		
	1.3.3	A only✓✓		**(6)**

TOTAL QUESTION 1: 20
SECTION A: 20

SECTION B

QUESTION 2

2.1.1 (a) B✓ Ribosome✓ (2)
(b) D✓ Golgi-body✓ (2)
(c) A✓ Nucleus✓ (2)

2.1.2 **1** Nucleoplasm✓ (1)
2 Crista✓ /Inner membranes (1)

2.1.3 -Transports substances through the cytoplasm✓
-Increases the internal surface area of the cell✓

-Smooth ER - processing, packaging and transport of lipids✓ (2)
-Rough ER- involved in protein synthesis✓
(Mark first TWO only) (Any 2)

2.1.4 - Energy (in the form of ATP) is released√
- From carbohydrates√
- In the presence of oxygen√ (Any 2) (2)

2.1.5 - Phospholipid molecules√
- and (large) protein molecules√
- move around √ (3)

TOTAL QUESTION 2: 15

QUESTION 3

3.1.1 (a) Starch✓/Fats (1)
(b) Glucose✓ (1)

3.1.2 Q✓ (1)

3.1.3 (a) Millon's reagent✓/ Biuret test (Copper sulphate solution and sodium-hydroxide solution) (1)
(b)
Millon's reagent
Clear✓- wine red✓

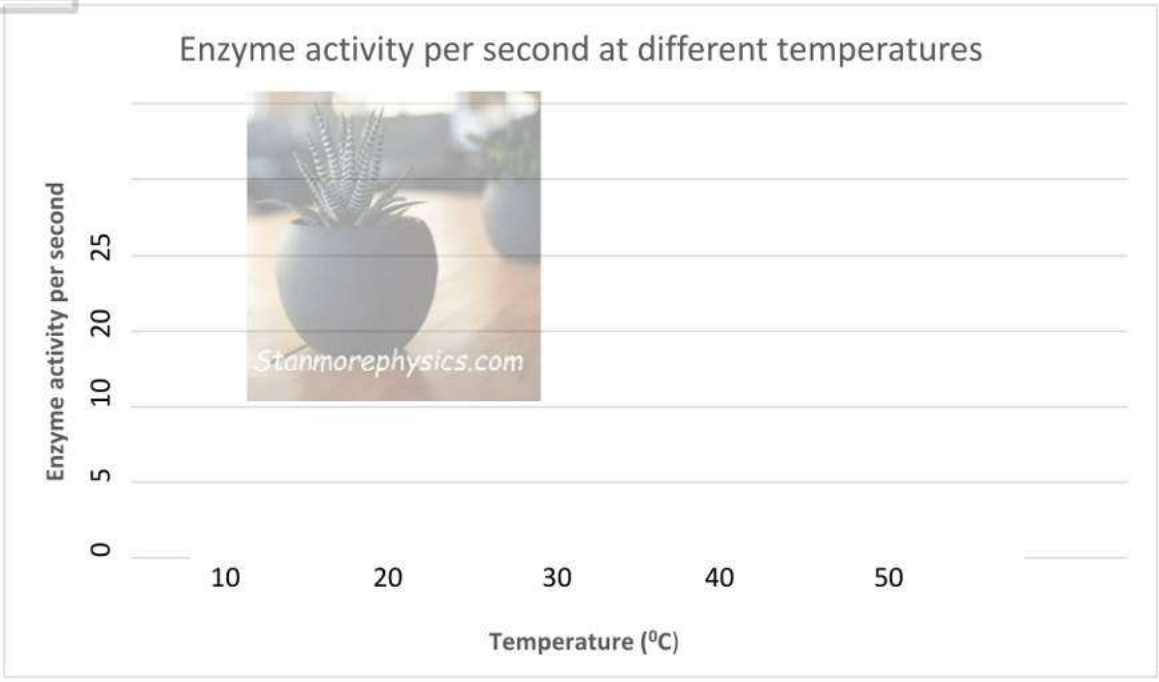
Biuret test
Blue✓ – Purple/violet ✓ (2)

(6)

3.2.1 Temperature✓ (1)

3.2.2 - The same test tubes √/ Test tubes with volume of 10 cm^3
- The same amount of milk used √/ **Fill milk up to 2 cm mark**
- The same amount of rennin added√ / **3ml rennin added**
- The same period√ / All test tube were kept for 15 min at different temperatures
(Mark first TWO only) (2)

3.2.3



(6)

Criteria	Mark allocation
Line graph is drawn **(T)**	1
Caption of the graph includes both variables **(C)**	1
Correct labels on X-axis and Y-axis with units **(L)**	1
Correct scale for X-axis and Y-axis. **(S)**	1
Plotting: **(P)** 1- 2 plotted correctly All 3 plotted correctly	 1 2

If axes are transposed:
• Can get all marks if labels are also swopped
• If labels are not corresponding, then:
➢ Marks will be lost for labels and scale
➢ Plotting can get credit if coordinates are correct for given labels

TOTAL QUESTION 3 15
TOTAL SECTION B: 30
GRAND TOTAL: 50

