GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

PROVINCIAL EXAMINATION

JUNE 2022

GRADE 9

NATURAL SCIENCES

EXEMPLAR

NAME OF LEARNER: _____

GRADE 9: _____

TIME: 2 hours

MARKS: 100

19 pages + 1 data sheet

QUESTION	1	2	3	4	5	6	7	TOTAL
LEARNER'S MARK								
MARKS	22	11	12	10	11	22	12	100

INSTRUCTIONS AND INFORMATION

1. Write your name and grade on the cover page of this question paper that serves as an ANSWER BOOK.

2. Answer ALL questions in the spaces provided.

3. This question paper consists of SECTION A and SECTION B based on the prescribed content framework in the CAPS Document.

4. Allocation of marks:

   SECTION A: 22
   SECTION B: 78

5. This question paper consists of SEVEN questions.

6. All drawings should be done in pencil and must be labelled in blue or black ink.

7. Write neatly and legibly.

EXEMPLAR

SECTION A

QUESTION 1

MULTIPLE-CHOICE QUESTIONS

1.1 Various options are provided as possible answers to the following questions. Choose the correct option by writing the correct letter (A – D) in the blocks provided.

1.1.1 When substances enter or leave any kind of cell, it must pass through the ... ☐

A Golgi apparatus.
B ribosome.
C cell wall.
D cell membrane. (1)

1.1.2 When an organism grows, it is because of ... ☐

A an uptake of water.
B an increase in mass.
C cells that are continually dividing.
D an uptake of food. (1)

1.1.3 Which of the following is an unspecialised cell? ☐

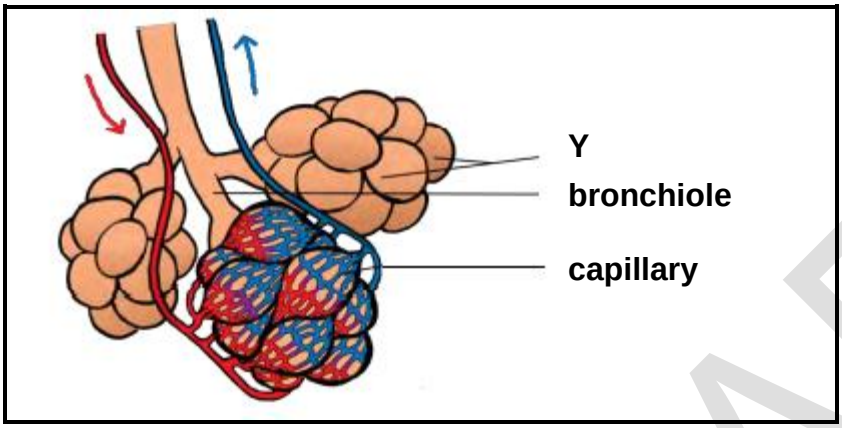
A Sperm cell
B Nerve cell
C Stem cell
D Red blood cell (1)

1.1.4 Which of the following is NOT a function of the tongue? ☐

A Secretes enzymes that digest starch in food
B Chewing of food and mixing it with saliva
C Forms a food bolus
D Helps with the swallowing process (1)

EXEMPLAR

1.1.5 Study the diagram below and choose the correct name for the part labelled **Y**.



A Blood
B Vein
C Alveoli
D Urine (1)

1.1.6 Study the following statements.

Exhaled air differs from inhaled air in the following respects:

1 Contains more carbon dioxide
2 Contains less oxygen
3 Contains more water vapour

Choose the correct combination.

A 1 and 2 only.
B 2 and 3 only.
C 1 and 3 only.
D 1, 2 and 3. (1)

EXEMPLAR

1.1.7 What is the function of the placenta?

A Provides nutrition to the foetus and removes waste products
B Transmits hereditary material between the mother and foetus
C Helps in identifying the gender of an unborn child
D An unborn child holds onto it to prevent being born prematurely (1)

1.1.8 Why are the elements Mg and Ca in the same group?

A They have similar chemical properties.
B Their atomic numbers are the same.
C Both are non-metals.
D Both are gases. (1)

1.1.9 The ratio in which the atoms of sulphur trioxide combine to form a molecule can be represented by:

A 2 : 1 : 3
B 3 : 1
C 1 : 3
D 3 : 3 (1)

1.1.10 Why is a universal indicator the most recommended indicator?

A It does not change colour at all.
B It only works in an acid.
C It is homemade.
D It functions in a wide range of pH values. (1)

[10]

EXEMPLAR

TERMINOLOGY

1.2 Give the correct scientific term for each of the following descriptions. Write only the term in the spaces provided.

1.2.1 The living, outermost membrane which surrounds the cytoplasm of cells

_____ (1)

1.2.2 The process whereby food is broken down into smaller particles by enzymes and acids in the mouth, stomach and intestines

_____ (1)

1.2.3 The blood vessel which carries deoxygenated blood away from the heart

_____ (1)

1.2.4 The cord which carries blood between the foetus and the placenta in humans

_____ (1)

1.2.5 A type of chemical reaction where a substance and oxygen react during burning to form a new product

_____ (1)

1.2.6 A non-metal that will not react with oxygen

_____ (1)
(6)

EXEMPLAR

MATCHING ITEMS

1.3 Choose an item from COLUMN B that matches a statement in COLUMN A. Write only the letter (A – H) next to the question numbers (1.3.1 – 1.3.6) in the spaces provided.

COLUMN A		COLUMN B	
1.3.1	Lasts for 28 days	A Abortion	1.3.1
1.3.2	Method of pregnancy prevention	B Oxygen	1.3.2
1.3.3	The inflammation of the lining of the bronchial tubes, which carry air to and from the lungs	C Menstrual cycle	1.3.3
1.3.4	A gas released when an acid reacts with a metal	D NaOH+HCl	1.3.4
1.3.5	Ignites with a popping sound	E Abstinence	1.3.5
1.3.6	Neutralisation process	F Asthma	1.3.6
		G Bronchitis	
		H H_2	

(1 x 6) **[6]**

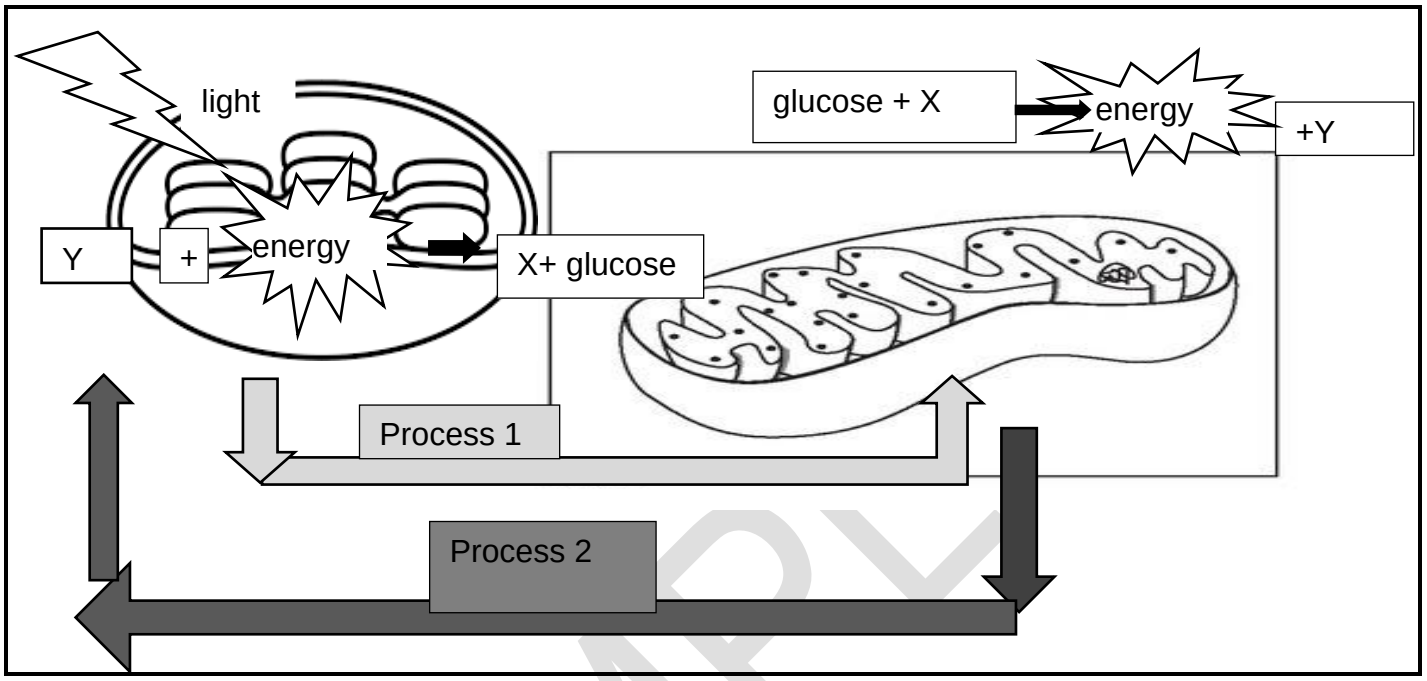
TOTAL SECTION A: 22

EXEMPLAR

SECTION B

QUESTION 2

The diagram below shows the link between two important organelles and the processes that they perform. Study the diagram below and answer the questions that follow.



2.1 Name the organelles in which the following takes place:

2.1.1 Process 1 _____ (1)

2.1.2 Process 2 _____ (1)

2.2 Identify the processes represented by:

2.2.1 Process 1 _____ (1)

2.2.2 Process 2 _____ (1)

2.2.3 The glucose produced in Process 1 is used in Process 2. What is the gas represented by **Y**?

_____ (1)

2.2.4 Energy is released in Process 2. What is the gas represented by **X**?

_____ (1)

2.2.5 Why is this gas mentioned in QUESTION 2.2.4 important to humans?

_____ (1)

EXEMPLAR

2.3 Complete the table below by indicating with a CROSS (X) whether the organelle or component will be present in a PLANT CELL ONLY or an ANIMAL CELL ONLY or in BOTH PLANT AND ANIMAL CELLS.

Organelle or component	Present in:		
	PLANT CELL ONLY	ANIMAL CELL ONLY	BOTH PLANT AND ANIMAL CELLS
Cell wall			
Cell membrane			
Cytoplasm			
A few small vacuoles or completely absent			

(4)
[11]

EXEMPLAR

QUESTION 3

A group of Grade 9 learners investigated the effect different types of exercises have on the heart rate. They measured the heart rate of 5 learners after each of the following activities:

- Rest
- Brisk walking for 5 minutes
- Jogging for 2 minutes
- Jumping with a skipping rope for 2 minutes.

They recorded their results in the table shown below.

Heart rate (beats per minute) after each activity				
	Rest	**Brisk walking**	**Jogging**	**Jumping**
Learner 1	66	72	80	98
Learner 2	72	72	86	100
Learner 3	72	74	82	108
Learner 4	68	74	84	96
Learner 5	78	86	100	120
AVERAGE	71,2	75,6	86,4	**X**

3.1 Identify the dependant variable.

_____ (1)

3.2 Calculate the value of **X** in the table (average heart rate for jumping with a skipping rope).

_____

_____ (2)

EXEMPLAR

3.3 In the space provided below, draw a bar graph to show the average heart rate for the different types of exercises.

(6)

Criteria	Marks
Heading/Title	1
Axes labelled	2
Plotting of data	3

3.4 Use the graph to identify the type of exercise that is the most effective in increasing the heart rate.

_____ (1)

3.5 Suggest ONE reason why a person's heart rate changes during exercise.

_____

_____

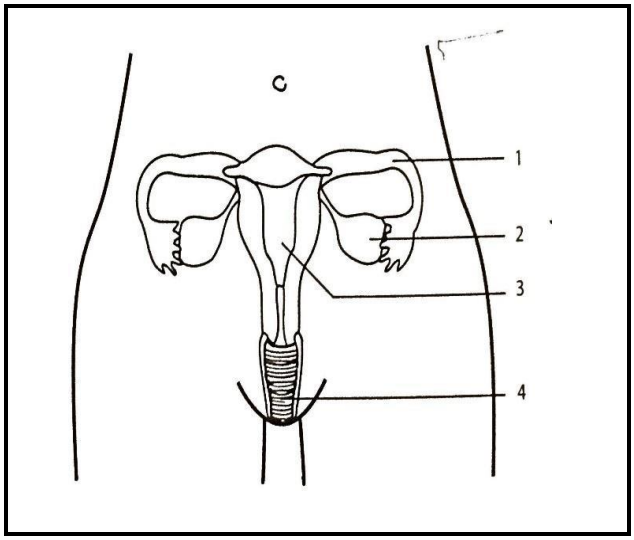
_____ (2)

[12]

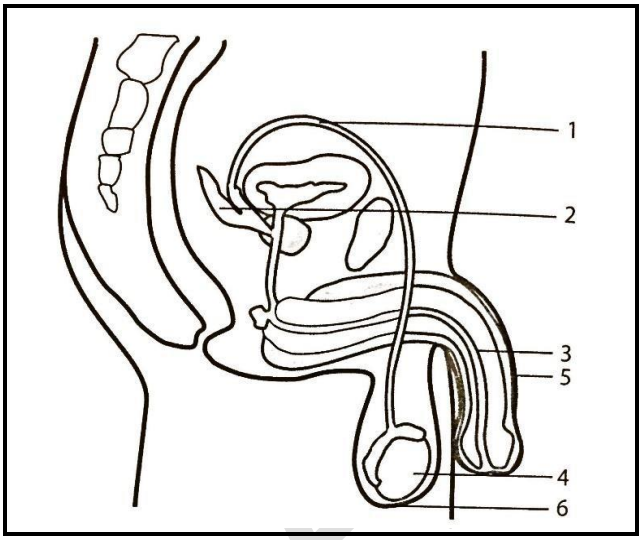
EXEMPLAR

QUESTION 4

Study the diagrams below and answer the questions that follow.



STRUCTURE A



STRUCTURE B

4.1.1 Identify the heading for structure **A** and structure **B**.

Structure **A**

_____ (1)

Structure **B**

_____ (1)

4.1.2 Label the following parts in structure **B**:

(a) Part 1 _____ (1)

(b) Part 6 _____ (1)

4.1.3 Give the number and the name of the part in structure **B** that:

(a) Transports both semen and urine _____ (2)

(b) Produces testosterone _____ (2)

4.1.4 Label the part marked **3** in structure **A**.

Part 3: _____ (1)

4.1.5 Name the part of structure **A** where fertilisation take place.

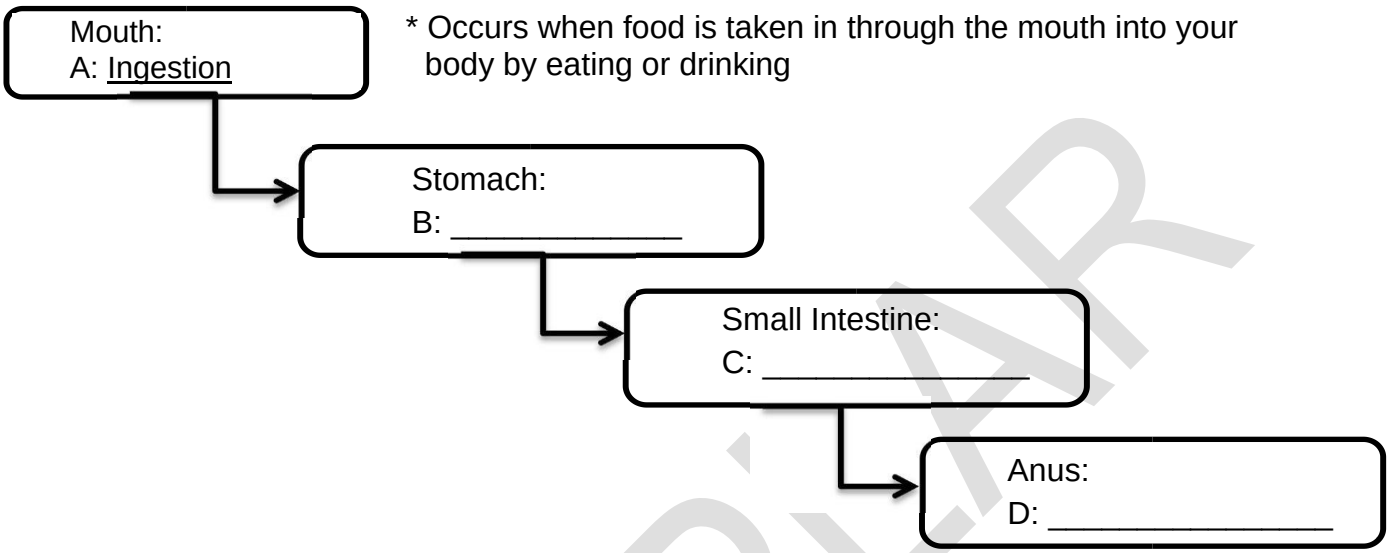
_____ (1)

[10]

EXEMPLAR

QUESTION 5

5.1 Below is a flow diagram of the processes within the digestive system. Study the flow diagram and complete it by writing the missing processes next to each letter which indicates where they take place.



(3)

5.2 Describe what happens in each of the processes from **B** to **D**.

B: _____

_____

_____ (2)

C: _____

_____

_____ (2)

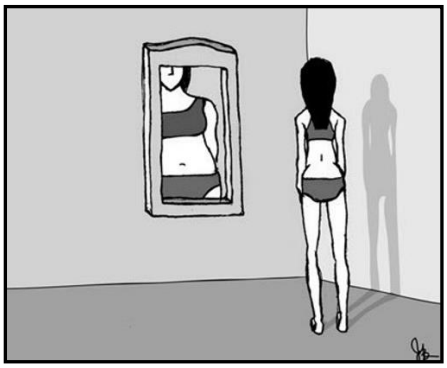
D: _____

_____

_____ (2)

EXEMPLAR

5.3 The picture below shows a person with an eating disorder that is associated with the digestive system.



5.3.1 Name the disorder that is shown in the picture above.

_____ (1)

5.3.2 Why should you always consult a doctor or healthcare worker before going on a weight loss diet?

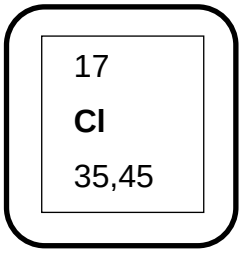
_____

_____ (1)

[11]

EXEMPLAR

QUESTION 6



6.1 What is atomic mass of the element above?

_____ (1)

6.2 Give the element's atomic number.

_____ (1)

6.3 Is the element a metal, a non-metal or a semi-metal?

_____ (1)

6.4 Write down the group number of the element in the periodic table.

_____ (1)

6.5 6.5.1 Write down the name and the chemical formula of the product formed when the element used in QUESTION 6 reacts with magnesium.

_____ (2)

6.5.2 Write down the formula for the diatomic molecule formed by the element mentioned above.

_____ (1)

EXEMPLAR

6.6 Answer the following questions.

6.6.1 Differentiate between a *pure substance* and a *mixture*.

(2)

6.6.2 Balance the following chemical equations.

(a) $Na + O_2 \rightarrow Na_2O$

(2)

(b) $H_2 + O_2 \rightarrow H_2O$

(2)

6.7 Rust is a process that occurs naturally and its effects can be quite beautiful but also very harmful and dangerous.



6.7.1 What is rusting and how is it undesirable for us?

(3)

6.7.2 List TWO ways to prevent iron from rusting.

(2)

EXEMPLAR

6.7.3 Study the key below and draw a picture of a balanced equation for the reaction between iron and oxygen in the space provided.

$Fe + O_2 \rightarrow Fe_2O_3$

Key: iron  oxygen 

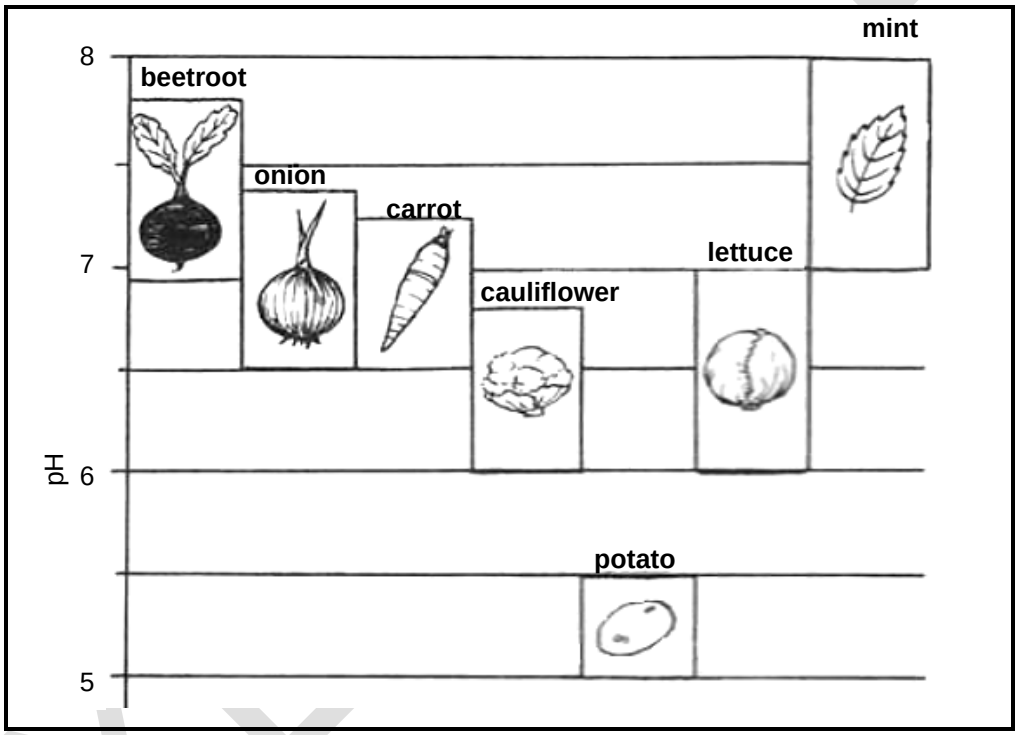
(4)
[22]

EXEMPLAR

QUESTION 7

Read the case study below and answer the questions that follow.

Different soils have different pH levels. Some soils are acidic and others are alkaline. The pH of a soil depends on the rock from which the soil was formed, and the plant remains that are in the soil. Soils from limestone are alkaline with a pH of about 8. Clay soils with decomposing plant material may have a more acidic pH of about 4 or 5. Some plants grow better in acidic soils and others grow better in neutral or alkaline soils. Most plants grow well in soils with a pH of 6,5. If the pH of the soil is not right, the plant will not grow very well. For this reason, farmers change the pH of the soil so that their crops will grow well. Acidic soil can be neutralised by adding powdered limestone or lime to the soil. Lime is a metal hydroxide and its chemical name is calcium hydroxide.



7.1.1 In what pH range will potatoes grow well?

_____ (1)

7.1.2 If the soil had a pH of 7,6, which crop (plant) could be grown in that soil?

_____ (1)

7.1.3 If the soil was found to have a pH of 6,5, which TWO kinds of plants could a farmer grow in that soil?

_____

_____ (2)

7.1.4 What can a farmer do if his soil has a pH of 4?

_____

_____ (2)

7.1.5 Write down the general word equation to show the reaction that happens when soil is neutralised.

_____ (2)

7.1.6 Write down the chemical formula for the hydroxide mentioned in the case study.

_____ (1)

7.1.7 Identify the colour of the universal indicator in the soil samples of:

(a) Limestone

_____ (1)

(b) Clay soil

_____ (1)

(c) Neutral soil

_____

_____ (1)

[12]

TOTAL SECTION B: 78

TOTAL: 100

EXEMPLAR

END

TABLE 3: THE PERIODIC TABLE OF ELEMENTS/*TABEL 3: DIE PERIODIEKE TABEL VAN ELEMENTE*

