



education

Department of
Education
FREE STATE PROVINCE

GRADE 9

NATURAL SCIENCES

JUNE 2018

TIME: 2 HOURS

TOTAL: 100

This question paper consists of 14 pages and a periodic table

INSTRUCTIONS

1. This paper consists of TWO SECTIONS:

SECTION A – One question (Question 1)

SECTION B – Seven questions (Questions 2 to 8)
2. Answer ALL the questions.
3. Number all the answers in your answer book exactly as the questions are numbered in the question paper.
4. Write neatly and legibly.
5. A periodic table is attached at the back of the question paper.

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 – D) next to the question number (1.1.1 – 1.1.10) in the ANSWER BOOK, e.g. 1.1.11 D

1.1.1 The part of a plant cell, that is needed in order to produce glucose as well as oxygen is the...

- A Chloroplast
- B Mitochondrion
- C Cell wall
- D Vacuole

1.1.2 The ovaries and uterus form part of the...

- A Digestive system
- B Nervous system
- C Reproductive system
- D Respiratory system

1.1.3 The hormone or hormones responsible for secondary sexual characteristics in males and females are...

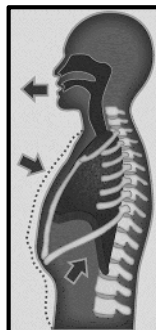
- A Only Oestrogen
- B Testosterone and Oestrogen
- C Growth hormone as well as Testosterone
- D Oestrogen as well as Growth hormone

1.1.4 The correct order for the stages of reproduction is as follows:

- A Sexual intercourse ⇒ Ovulation ⇒ Fertilization ⇒ Pregnancy
- B Fertilization ⇒ Ovulation ⇒ Sexual intercourse ⇒ Pregnancy
- C Ovulation ⇒ Fertilization ⇒ Sexual intercourse ⇒ Pregnancy
- D Ovulation ⇒ Sexual intercourse ⇒ Fertilization ⇒ Pregnancy

1.1.5 The following diagram represents ...

- A Gaseous exchange
- B Inhalation
- C Exhalation
- D Respiration



1.1.6 The chemical symbol used for carbon is ...

- A K
- B C
- C Ca
- D Co

1.1.7 Why do Beryllium and Magnesium appear in the same group on the periodic table?

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

1.1.8 Hydrogen nitrate (HNO_3) consists of the following elements:

- A Helium, Nitrate and Oxygen
- B Hydrogen, Nitrate
- C Hydrogen, Nitrogen and Oxygen
- D Hydrogen, Oxygen and Ozone

1.1.9 Which one of the following is an example of a compound?

- A H_2SO_4
- B O_2
- C 2Fe
- D Na

1.1.10 Which ONE of the following chemical equations does NOT represent a balanced chemical equation?

- A $\text{SO}_2 + \text{H}_2\text{O} \rightarrow \text{H}_2\text{SO}_3$
- B $4\text{Na} + \text{O}_2 \rightarrow 2\text{Na}_2\text{O}$
- C $\text{Mg}(\text{OH})_2 + 2\text{HCl} \rightarrow \text{MgCl}_2 + 2\text{H}_2\text{O}$
- D $2\text{Al} + 3\text{O}_2 \rightarrow \text{Al}_2\text{O}_3$

10x1=(10)

1.2 Give ONE word/term for each of the following descriptions. Write only the correct word/term next to the question number (1.2.1 – 1.2.10) on your ANSWER SHEET.

1.2.1 The apparatus that is used to study very small objects like cells and micro-organisms.

1.2.2 When a person does not receive enough oxygen to the brain, due to the blockage of a blood vessel by a blood clot, it can lead to

1.2.3 The common name given to both male and female reproductive cells.

1.2.4 The breakdown of the thick layer of blood in the uterus, which is released through the vagina.

1.2.5 The type of digestion, which involves the breakdown of food with digestive enzymes and hydrochloric acid.

1.2.6 A substance which changes colour when it comes into contact with an acid or a base.

1.2.7 The solution used to test for the presence of carbon dioxide gas.

1.2.8 The smallest possible building block of a compound that has all the properties of the compound.

1.2.9 The common name of the elements that are found in group 18 (VIII) on the periodic table.

1.2.10 A pure substance consisting of identical atoms. 10x1=(10)

- 1.3. Choose the item in COLUMN B that best matches the description in COLUMN A. Write down only the letter (A-I) next to the correct question number (1.3.1 – 1.3.4) in your ANSWER BOOK, e.g. 1.3.5 A.

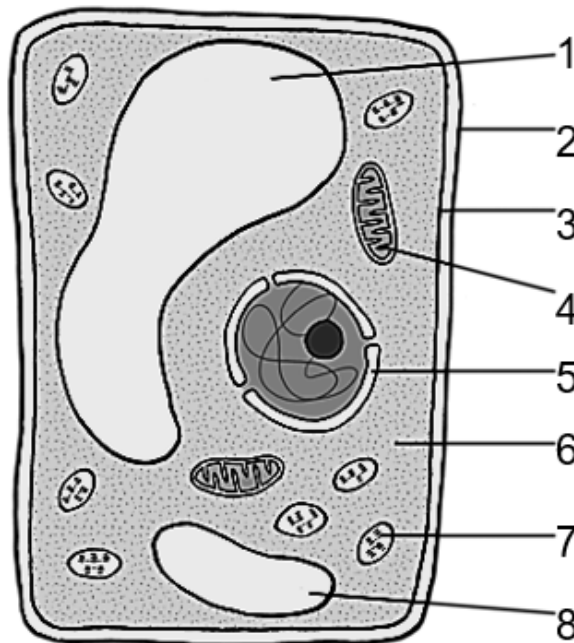
Column A	Column B
1.3.1 Element in Group 1 that is a non-metal.	A Neutralization
1.3.2 The process that takes place when an acid reacts with a base.	B Sodium
1.3.3 An element that occurs as a molecule.	C Hydrogen
1.3.4 The colour of bromothymol blue in an acidic solution.	D Nitrification
	E Blue
	F Noble gas
	G Yellow
	H Carbon dioxide
	I Red

(4)
[24]

SECTION B

QUESTION 2

- 2.1 Ronaldo is a grade 9 learner that received the following diagram of a plant cell. Help him to identify the cell as a plant cell, by studying the diagram and answering the questions that follow.



- 2.1.1 Use the diagram and identify the parts labelled 2, 5, and 6. (3)

- 2.1.2 Ronaldo used organelles 1 and 7 on the diagram to identify the cell as a plant cell.

Draw the table below in your ANSWER BOOK and make use of organelle 1 and 7, to TABULATE TWO differences between a plant and an animal cell. Make sure to also write down the names of organelle 1 and 7 in the spaces provided in the table.

	Name of Organelle	<u>Plant Cell</u>	<u>Animal Cell</u>
Organelle 1			
Organelle 7			

(6)

2.1.3 Organelle 4 is responsible for cellular respiration.

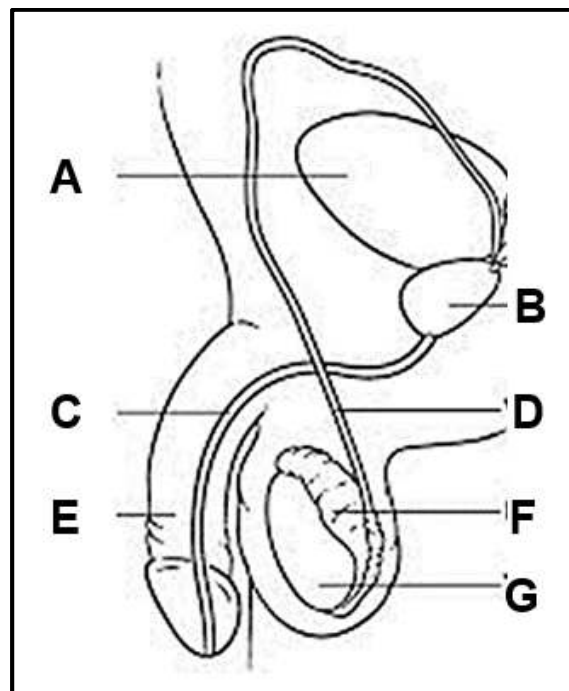
2.1.3.1 Name organelle 4. (1)

2.1.3.2 Explain why there are so many of organelle 4 present in a cell. (1)

2.1.3.3 Organelle 4 produces a toxic by-product. Name this by-product and explain how the body gets rid of it. (2)

[13]

2.2 Study the following diagram of the male sex organ, and answer the questions that follow:



2.2.1 Name parts C, D and E. (3)

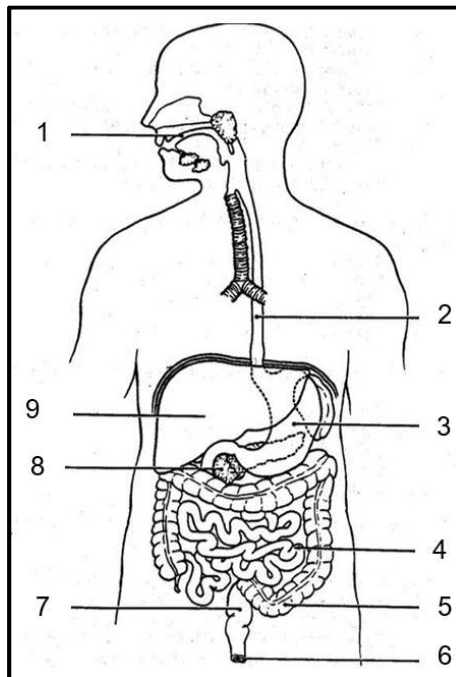
2.2.2 Give the LETTER and the NAME of the part, where sperm is produced. (2)

2.2.3 Each of the above parts receives blood through an artery.
Name the gas that is transported by the blood in the arteries. (1)

2.2.4 Veins are used to take the blood back to the heart. Name the gas that is transported by the blood in the veins. (1)

2.2.5 Name the process and explain in full sentences how the gases named in 2.2.3 and 2.2.4 travel in and out of the cells. (3)
[10]

2.3. Use the following diagram to answer the questions that follow:



2.3.1 The digestive system makes use of both chemical as well as mechanical digestion. Explain what you understand by the term mechanical digestion. (1)

2.3.2 Make use of the diagram above and give the NUMBERS, as well as NAMES of THREE places in the digestion system where mechanical digestion takes place. (3)

2.3.3 Give the name of the part where faeces is stored before it leaves the body through the anus. (1)

2.4 Janine decided to lose some weight for the upcoming school concert. She got the following diet (eating plan) from the internet and decided to follow it strictly on a daily basis.

- Breakfast: 1 Hardboiled egg
- Snack: 1 Apple and 30 g nuts
- Lunch: Steamed fish with a green salad
- Snack: 1 Cup chopped cucumber
- Dinner: 250 ml Yoghurt with 50 grams of fruit

2.4.1 Would you say that this is a balanced eating plan? Motivate your answer. (2)
[7]

QUESTION 3

- 3.1 Sexually transmitted diseases like HIV cause many health problems, which lead to many people in our country becoming ill and therefore not able to work. This fact is very negative for our country's economy.

The following table shows the number of people suffering from HIV as a percentage (%) of the total number of people living in each of the nine Provinces of South Africa.

Province	Percentage (%) of people suffering from HIV
KZN	27.6
MP	26
FS	19.6
EC	18.7
NW	18.6
GP	18.5
LP	14
NC	10
WC	9.2

- 3.1.1 Use the information in the table and draw a **bar graph** showing the percentage (%) of people suffering from HIV in each of our nine Provinces. Make sure that you provide your graph with a title and labels for both the X-and Y-axes.

Marks will be awarded as follows

Accuracy of your graph	2 marks
Correct heading	1 mark
Correct labels for the axes of your graph	2 marks

(5)

- 3.1.2 Identify the dependent variable in this investigation. (1)
- 3.1.3 Why is it such a big problem that people between the ages of 30 and 49 are suffering from diseases such as HIV? (1)
- 3.1.4 There are two systems in the human body involved in the transmission of HIV from one person to another. Name these two systems. (2)
- 3.1.5 What can be used during sexual intercourse to prevent the transmission of HIV. (1)

[10]

QUESTION 4

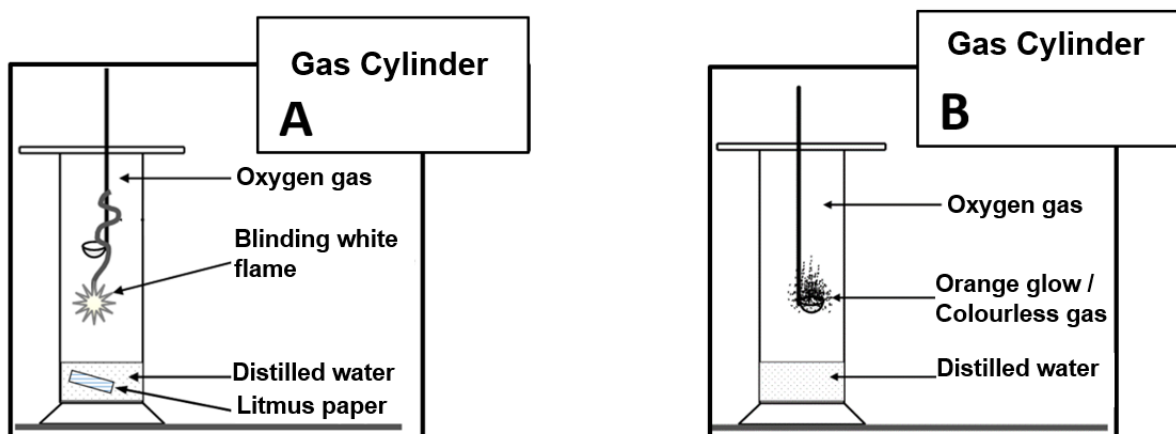
The following experiment is carried out to demonstrate the combustion of two elements, namely magnesium and carbon in oxygen gas.

A small piece of each of the mentioned elements are placed in two separate deflagrating spoons and heated over open flames. The heated elements are then lowered into two separate gas cylinders (A and B), filled with oxygen gas.

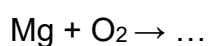
Observations:

The element which was placed in **gas cylinder A** burned with a blinding white flame. The product which formed during this reaction was dissolved in distilled water at the bottom of the cylinder. A piece of pink litmus paper turned blue after it was placed in this solution.

The element placed in **gas cylinder B** glowed with a bright orange colour and liberated a colourless gas.



- 4.1. What is meant with the term "combustion" in the experiment above? (1)
- 4.2 Answer the following questions taking into account the observations, and results from the above experiment.
- 4.2.1 Write down the SYMBOL of the element used in gas cylinder A. (1)
- 4.2.2 Write down the NAME of the element used in gas cylinder B. (1)
- 4.2.3 Write down the NAME of the PRODUCT which formed in gas cylinder A. (1)
- 4.3 Complete and balance the following chemical equation:



(2)
[6]

QUESTION 5

When a shifting spanner, consisting mainly of iron is left outside in the rain, a thin layer of a reddish-brown powder starts to form on its surface within a few weeks.



5.1. What is the **common** name for the reddish-brown layer of powder that forms on the surface of the shifting spanner? (1)

5.2. What is this process called when iron reacts with oxygen in the presence of moisture? (1)

5.3. The chemical reaction that takes place during the formation of the Reddish-Brown layer can be represented as follows:

Iron + Oxygen gas → Iron oxide

5.3.1 Use chemical formulae and write down a **BALANCED** chemical equation for the above mentioned reaction. (4)
[6]

QUESTION 6



Sulfur occurs as a yellow powder that can be used in the control of certain fungal diseases on plants. When sulfur burns in oxygen, it forms a colourless gas namely sulphur dioxide. This gas has a suffocating smell and forms an acid when it dissolves in water.

6.1. Write down the chemical symbol for sulphur. (1)

6.2. Complete the sentence:

Non-metal oxides are also referred to as _____ oxides. (1)

6.3. Write down the **FORMULA** for the compound that will form when sulfur burns in oxygen. (1)

6.4. The acid that forms when sulfur dioxide gas dissolves in moisture which is found in the atmosphere is very harmful to our environment. Describe **TWO** of these negative, harmful effects. (2)
[5]

VRAAG 7

An experiment was carried out with the purpose to investigate how fast (rate) iron reacts with hydrochloric acid solutions with different pH values.

Seven similar iron bars, each weighing 100g were placed into separate test tubes containing hydrochloric acid solutions with different pH values. It is important to note that the solutions used were the same in every aspect, with the exception of their pH values that were not the same.

The mass of iron that reacted with the different hydrochloric acid solutions were determined by weighing the iron bars after they were allowed to react with the solutions for 10 minutes.

The mass of iron (in gram) that reacted with the different hydrochloric acid solutions in a time of 10 minutes, are given in the table below:

Test tube	A	B	C	D	E	F	G
pH-value of the solution	1	2	3	4	5	6	7
Mass (g) of iron that reacted	60	55	50	45	15	10	5

- 7.1 Write down a possible hypothesis for this experiment. (2)
- 7.2 Identify the **dependent** variable in this experiment. (1)
- 7.3 Identify the **independent** variable in this experiment. (1)
- 7.4 What is the pH value of the solution with the highest acidity in the table above? (1)
- 7.5 In which test tube (A-G) will a neutral solution be found? (1)
- 7.6 Write down the CHEMICAL SYMBOL of the metal that was used during this experiment. (1)
- 7.7 Write down the **general word equation** for the reaction between an acid and a metal. (2)
- 7.8. Name two properties of acids. (2)

[11]

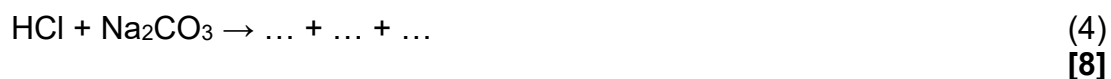
QUESTION 8

8.1 Sindi's father regularly experiences heartburn when stomach acid (hydrochloric acid) pushes up into his oesophagus. Her father then drinks a glass of water with an antacid dissolved in the water. The antacid contains sodium carbonate.

8.1.1 A salt and two more products form when an acid reacts with a metal carbonate. Write down the NAMES of these TWO products that will form together with the salt. (2)

8.1.2 A gas is released while the above reaction is taking place. Write down the FORMULA of this gas and explain how you can test for this gas in the laboratory. (2)

8.1.3 Complete and balance the following reaction:



SECTION B: 76
GRAND TOTAL:100

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

1 (I)	2 (II)	3	4	5	6	7	8	9	10	11	12	13 (III)	14 (IV)	15 (V)	16 (VI)	17 (VII)	18 (VIII)
1 2,1 H 1	<p>KEY/SLEUTEL</p> <p>Atomic number <i>Atoomgetal</i></p> <p>Electronegativity <i>Elektronegatiwiteit</i></p> <p>Symbol <i>Simbool</i></p> <p>Approximate relative atomic mass <i>Benaderde relatiewe atoommassa</i></p>																2 He 4
3 1,0 Li 7	4 1,5 Be 9	<div> <div>29 1,9 Cu 63,5</div> </div>										5 2,0 B 11	6 2,5 C 12	7 3,0 N 14	8 3,5 O 16	9 4,0 F 19	10 Ne 20
11 0,9 Na 23	12 1,2 Mg 24											13 1,5 Al 27	14 1,8 Si 28	15 2,1 P 31	16 2,5 S 32	17 3,0 Cl 35,5	18 Ar 40
19 0,8 K 39	20 1,0 Ca 40	21 1,3 Sc 45	22 1,5 Ti 48	23 1,6 V 51	24 1,6 Cr 52	25 1,5 Mn 55	26 1,8 Fe 56	27 1,8 Co 59	28 1,8 Ni 59	29 1,9 Cu 63,5	30 1,6 Zn 65	31 1,5 Ga 70	32 1,8 Ge 73	33 2,0 As 75	34 2,4 Se 79	35 2,8 Br 80	36 Kr 84
37 0,8 Rb 86	38 1,0 Sr 88	39 1,2 Y 89	40 1,4 Zr 91	41 Nb 92	42 1,3 Mo 96	43 1,3 Tc	44 2,2 Ru 101	45 2,2 Rh 103	46 2,2 Pd 106	47 1,9 Ag 108	48 1,7 Cd 112	49 1,7 In 115	50 1,8 Sn 119	51 1,9 Sb 122	52 2,1 Te 128	53 2,5 I 127	54 Xe 131
55 0,7 Cs 133	56 0,9 Ba 137	57 La 139	72 1,6 Hf 179	73 Ta 181	74 W 184	75 Re 186	76 Os 190	77 Ir 192	78 Pt 195	79 Au 197	80 Hg 201	81 1,8 Tl 204	82 1,8 Pb 207	83 1,9 Bi 209	84 2,0 Po	85 2,5 At	86 Rn
87 0,7 Fr	88 0,9 Ra 226	89 Ac															
58 Ce 140	59 Pr 141	60 Nd 144	61 Pm	62 Sm 150	63 Eu 152	64 Gd 157	65 Tb 159	66 Dy 163	67 Ho 165	68 Er 167	69 Tm 169	70 Yb 173	71 Lu 175				
90 Th 232	91 Pa	92 U 238	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr				