LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
EDUCATION

NATIONAL
SENIOR CERTIFICATE

GRADE 10

PHYSICAL SCIENCES
PAPER 1
JUNE EXAMINATION
2026

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MARKS: 100

TIME: 2 HOURS

This question paper consists of 10 pages including 1 datasheet

INSTRUCTIONS AND INFORMATION

1. Write your NAME, SUBJECT, GRADE AND DATE on the ANSWER BOOK.
2. This question paper consists of SEVEN questions. Answer ALL the questions in the ANSWER BOOK.
3. Start EACH question on a NEW page in the ANSWER BOOK.
4. Number the answers correctly according to the numbering system used in this question paper.
5. Leave ONE line between two sub questions, for example between QUESTION 2.1 and QUESTION 2.2.
6. You may use a non-programmable calculator.
7. You are advised to use the attached DATA SHEETS.
8. Show ALL formulae and substitutions in ALL calculations.
9. Round off your final numerical answers to a minimum of TWO decimal places.
10. Give brief motivations, discussions, et cetera where required.
11. Write neatly and legibly.



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QUESTION 1: Multiple Choice questions

Four options are given as possible answers to the following questions. Choose the answer and write down only the letter (A – D) next to the question number (1.1 – 1.8), for example, 1.9 D.

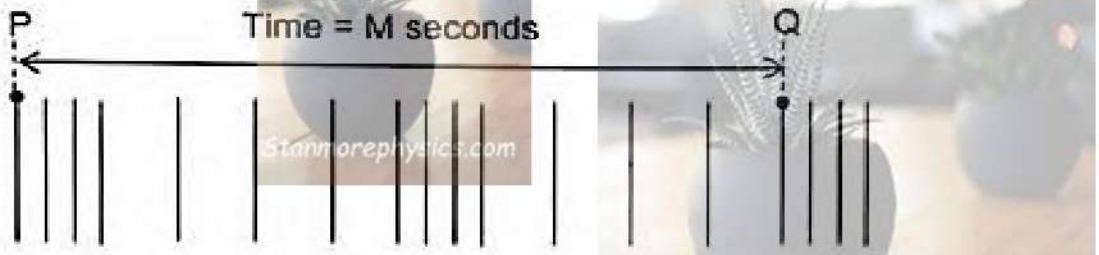
1.1 In which ONE of the following do sound waves travels the fastest.

A. Vacuum
B. Water
C. Solid diamond
D. Air (2)

1.2 The definition of a *period* is….

A. time taken to complete one oscillation.
B. time taken to move from crest to through
C. distance between two consecutive points in phase.
D. number of waves that passes a point in one second. (2)

1.3 The diagram below shows a wave that takes **M** seconds to travel from point **P** to point **Q.**



Which of the following is the frequency of the wave?

A. 0,5 M
B. M Hz
C. $\frac{2}{M}$ Hz
D. $\frac{1}{M}$ Hz (2)

1.4 Ultraviolet light can be used:

A. to scan human bones.
B. to clean the equipment in the laboratory.
C. in a TV remote.
D. in Wi-Fi. (2)

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1.5 A rubber balloon obtains a negative charge after it has been rubbed against human hair.

Which one of the statements below best explains why this happens?

A. Negative charges are transferred from the rubber ballon to the human hair.

B. Positive charges are transferred from the rubber ballon to the human hair.

C. Positive charges are transferred from hair to the rubber balloon.

D. Negative charges are transferred from human hair to the rubber balloon. (2)

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1.6 Which ONE of the following will results in an object becoming positively charged?

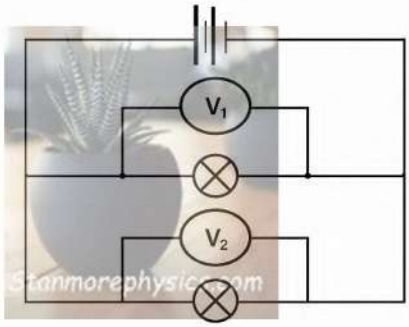
A. Gains electrons.

B. Loses electrons.

C. Gains protons.

D. Loses protons. (2)

1.7 Two identical light bulbs are connected in parallel, as shown in the circuit diagram below. Voltmeters V_1 and V_2 are connected across each light bulb.



Which one of the following mathematical statements correctly describes the relationship between the readings on voltmeters V_1 and V_2?

A. $V_1 = 2V_2$

B. $V_1 = ½V_2$

C. $V_1 = 4\ V_2$

D. $V_1 = V_2$ (2)

1.8 Which ONE of the quantities below is the CORRECT unit of measurement given.

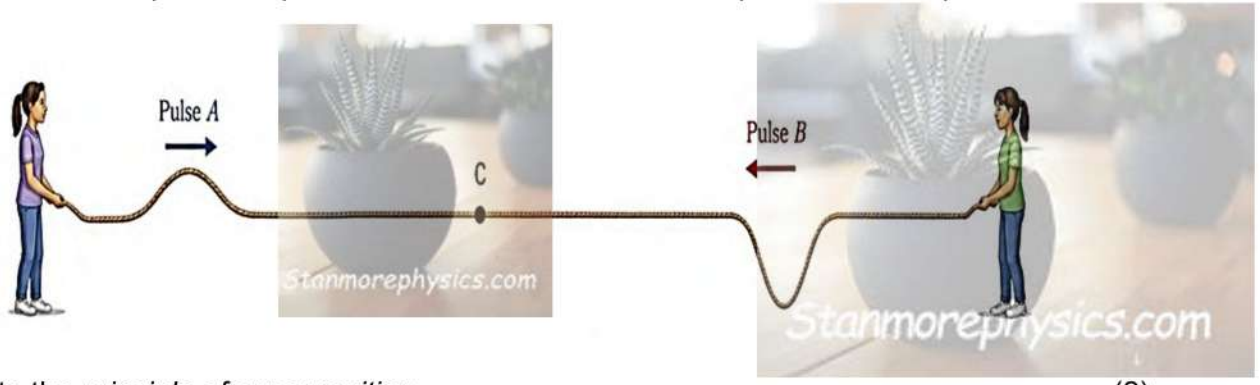
	QUANTITY	UNIT
A	Current	C. s^{-1}
B	Energy	kW
C	Potential difference	$V.s^{-1}$
D	Resistance	V.s

(2)

[16]

QUESTION 2 (Start on a new page)

Two girls stand at opposite ends of the rope; each makes a pulse of the **SAME SPEED**. Pulse **A** with amplitude of 6 cm moves to the right and pulse **B** with the amplitude which is **FOUR TIMES** the amplitude of pulse A moves to the left. The two pulses meet at point **C.**



2.1 State the *principle of superposition*. (2)

2.2 Is the interference at point **C** destructive or constructive inference? (1)

2.3 Calculate the resulting amplitude when the two pulses meet at point **C**. (2)

2.4 What will happen to amplitude of pulse **A** after two pulses meets? Write only **INCREASE, DECREASE or REMAINS THE SAME**. (1)

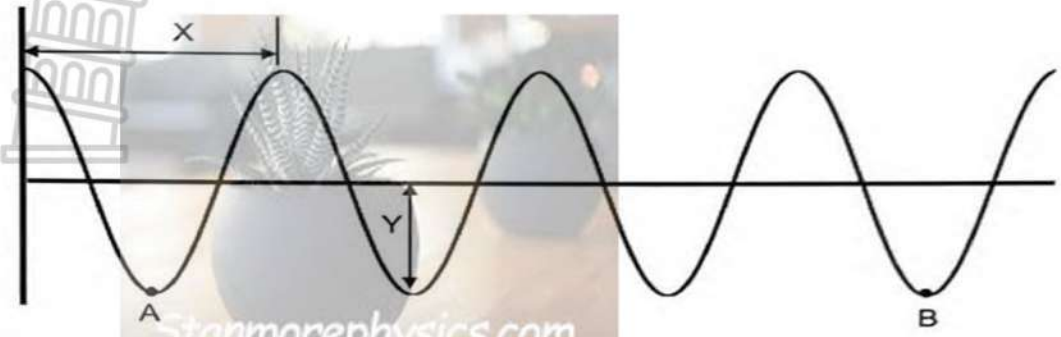
2.5 Pulse **A** travels a distance of 4 m in 0.5 seconds, calculate the speed of pulse **B**. (3)

[9]

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QUESTION 3 (Start on a new page)

The diagram below shows a transverse wave of frequency of 30 Hz moving from left to right.



The length of **X** is 50 cm, and the length of **Y** is 100 cm.

3.1 Define the term *transverse wave*. (2)

3.2 Write down the value of the:

3.2.1 wavelength (1)

3.2.2 amplitude (1)

3.3 Calculate the following:

3.3.1 Period (3)

3.3.2 Speed of the wave (3)

3.3.3 Distance between point **A** and point **B** (2)

3.3.4 Time between point **A** and point **B** on the graph (2)

3.4 If the distance **Y** on the diagram is DOUBLED, what will happen to the frequency of the wave? WRITE ONLY DOUBLED, HALVED, OR REMAINS CONSTANT.

Explain your answer. (2)

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QUESTION 4 (Start on a new page)

4.1 A sound wave produced by a piano is represented in the diagram below.



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4.1.1 Name the parts labelled **A** and **C**. (2)

4.1.2 Explain why point **A** and **B** are not in phase. (1)

4.1.3 The highest frequency a human ear can hear is 20 kHz.

If a piano produces a sound wave of wavelength of 10 cm, determine by means of calculations, whether the frequency produced by a piano can be heard by the human ear. (Note: The speed of sound in air is 340 $m.s^{-1}$.) (4)

4.1.4 What will happen if this piano was played in a vacuum? Explain your answer. (2)

4.2 A boy stands between two birds that are 100 metres apart and blows a whistle once as shown in the diagram below. Bird A hears the sound after 0,094 seconds.



Assume the boy and the birds are on the same horizontal plane and speed of sound in air is 340 $m.s^{-1}$

4.2.1 Explain the meaning of the word *echo.* (1)

4.2.2 Determine by means of calculations which bird (**A** or **B**) will hear the sound first. (5)

[15]

QUESTION 5 (Start on a new page)

The frequency and energy for different types of electromagnetic radiation is presented in the table below:

	Frequency (Hz)	**Energy (J)**
A	$6{,}04 \times 10^{10}$	6×10^{-22}
B	$3{,}03 \times 10^{19}$	**Y**
C	**X**	2×10^{-17}

5.1 Define the term *photon*. (2)

5.2 Use the table above to calculate the:

5.2.1 Energy of radiation B. (3)

5.2.2 Wavelength of radiation C. (4)

5.3 Which type of radiation, A, B, or C has the lowest wavelength? Explain your answer. (2)

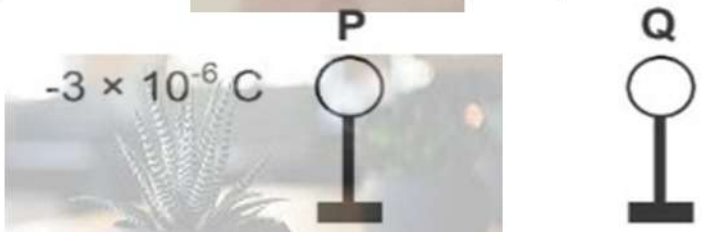
5.4 Draw a graph without showing any values to show the relationship between frequency and penetrating ability.
• Label frequency on your x-axis and penetrating ability on your Y-axis. (2)

5.5 Write down one medical use of x-rays. (1)

[14]

QUESTION 6 (Start on a new page)

The diagram below shows two small identical spheres, **P** and **Q**, on insulated stands. The charge on sphere **P** is -3×10^{-6} C and the charge on sphere **Q** is unknown.



6.1 State the *principle of conservation of charge*. (2)

6.2 Calculate the number of electrons in excess on sphere **P**. (3)

6.3 The two spheres are brought into contact and are then returned to their original positions. Each sphere now carries a charge of -1×10^{-6} C.

6.3.1 Calculate the original charge on sphere **Q** before the spheres were brough into contact. (3)

6.3.2 Were electrons transferred from **P TO Q** or from **Q TO P** during contact? (1)

6.3.3 Calculate the number of electrons transferred. (4)

6.4 What will happen to the charge of spheres if the spheres are placed on metal stands instead of insulated stands. (1)

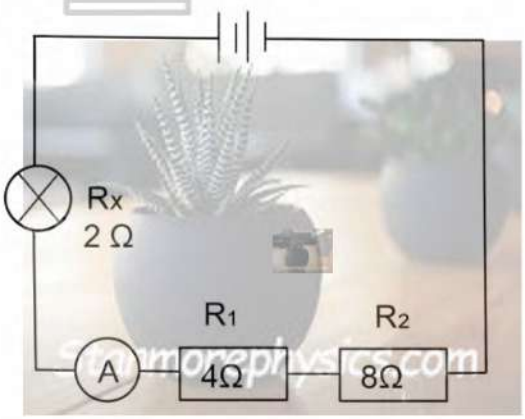
[14]

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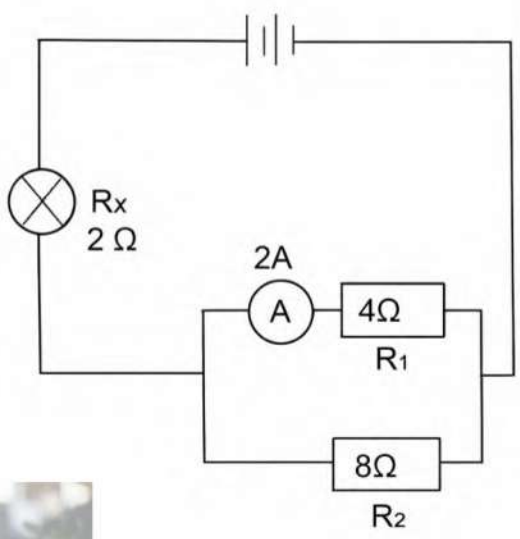
QUESTION 7 (Start on a new page)

Circuit 1 and circuit 2 with 14V battery consists of two resistors of 4 Ω and 8 Ω respectively, a bulb of resistance of 2 Ω with ammeter and conducting wires as shown below. Assume that the ammeter and conducting wires have negligible resistance.

CIRCUIT 1



CIRCUIT 2



7.1 Define the term *current* in words. (2)

7.2 Is circuit 2 representing a SERIES CIRCUIT, PARALLEL CIRCUIT OR COMBINATION OF SERIES AND PARALLEL CIRCUIT? (1)

7.3 Calculate the total resistance in circuit 2. (4)

7.4 Is the ammeter in circuit 1 reading current that is GREATER THAN, SMALLER THAN, or EQUAL TO the current that the ammeter in circuit 2 is reading. Show all calculations. (4)

7.5 Determine the charge passing through the 4 Ω resistor in 3 minutes, in circuit 2. (3)

7.6 In which circuit the battery will run out faster between circuit 1 and circuit 2 in the diagrams above. Explain your answer. (2)

[16]

TOTAL: [100]

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DATA FOR PHYSICAL SCIENCES GRADE 10
PAPER 1 (PHYSICS)

TABLE 1: PHYSICAL CONSTANTS

NAME	SYMBOL	VALUE
Acceleration due to gravity	g	9,8 $m.s^{-2}$
Speed of light in a vacuum	c	3,0 x 10^8 $m \cdot s^{-1}$
Planck's constant	h	6,63 x 10^{-34} $J \cdot s$
Charge on electron	q_e	-1,6 x 10^{-19} C
Electron mass	m_e	9,11 x 10^{-31} kg

TABLE 2: FORMULAE

WAVES, SOUND AND LIGHT

$v = f\lambda$ or $c = f\lambda$	$T = \frac{1}{f}$
E = hf	$E = \frac{hc}{\lambda}$

ELECTROSTATICS

$Q = n \times q_e$	$Q = \frac{Q1 + Q2}{2}$

ELECTRIC CIRCUITS

$Q = I \times \Delta t$	$\frac{1}{Rp} = \frac{1}{R_1} + \frac{1}{R_2} + \cdots$
$R_s = R_1 + R_2 + \cdots$	$V = \frac{W}{Q}$
V = I x R	

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