



LIMPOPO

PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
EDUCATION

NATIONAL SENIOR CERTIFICATE
GRADE 10

PHYSICAL SCIENCES: PHYSICS (P1)
MEMORANDUM

MID-YEAR EXAMINATION 2014

MARKS: 150

This Memorandum consists of --5--- pages

INSTRUCTIONS AND INFORMATION

1. Read page33-34of the grade 12 examination guidelines before you start marking.
2. Do not change this memo.

QUESTION 1

- 1.1. C✓✓
- 1.2. B✓✓
- 1.3. D✓✓
- 1.4. C✓✓
- 1.5. A✓✓
- 1.6. C✓✓
- 1.7. B✓✓
- 1.8. C✓✓
- 1.9. B✓✓
- 1.10.D✓✓

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QUESTION 2

- 2.1.1 4 cm ✓✓ OR 0.04 m (2)
- 2.1.2 0.1 s ✓✓ (2)
- 2.1.3 $f = 1/T ✓ = 1/0.1 ✓ = 10 \text{ Hz } ✓$ (3)
- 2.2 $v = \lambda f ✓$ and $\lambda = v/f = 20 ✓ / 10 ✓ = 2 \text{ m } ✓$ [OR $v = \lambda/T ✓$ and $\lambda = vT = 20 ✓ \times 0.1 ✓ = 2 \text{ m } ✓$] (4)
- 2.3.1 Longitudinal wave. ✓✓ (2)
- 2.3.2 Rarefactions. ✓✓ (2)
- 2.3.3 Compressions. ✓✓ (2)
- 2.3.4 0.225 m ✓✓ (2)
- 2.3.5 $f = v/\lambda = 9/0.225 ✓ = 40 \text{ Hz } ✓$ and $T = 1/f = 1/40 ✓ = 0.025 \text{ s } ✓$ (4)
 OR $v = \lambda/T$ and $T = \lambda/v = 0.225 ✓ / 9 ✓ = 0.025 \text{ s } ✓✓$
- 2.4.1 By the reflection of sound. ✓✓ (2)
- 2.4.2 Av time = $(3.01 + 2.95 + 3.04) \div 3 = 3 \text{ s } ✓$ $v = \Delta s / \Delta t ✓ = 1000 ✓ / 3 ✓ = 333.33 \text{ m} \cdot \text{s}^{-1} ✓$. (5)
 (accept v = distance/time)
- 2.5 **Amplitude** ✓ of sound wave and the **frequency** ✓ of sound wave (2)

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QUESTION 3

- 3.1 Accelerating charges./ by the acceleration of electrically charged particles. ✓✓ (2)
- 3.2 Light sometimes **act like a wave**, ✓ and sometimes **act like a particle** ✓, depending on the experiment you are performing. (2)
- 3.3 wavelength increases (5)

Gamma rays ✓	X-ray ✓	visible light ✓	Infrared rays ✓,	microwaves ✓
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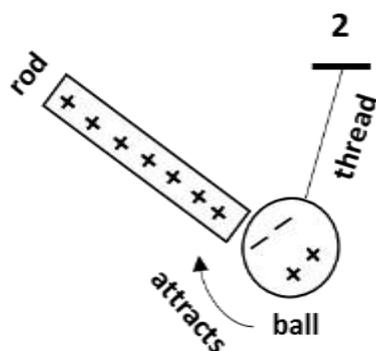
- 3.4 Gamma rays ✓, It has the highest frequency ✓, and the highest energy ✓. (3)

- 3.5 A little packet of energy and it is the basic particle of electromagnetic radiation. /a particle representing a quantum of light or other electromagnetic radiation./ a quantum of electromagnetic radiation. ✓✓ (2)
- 3.6 $E = hc/\lambda$ ✓ = (6.63×10^{-34}) ✓ (3×10^8) ✓ $\div (0.015 \times 10^{-9})$ ✓ = $1.326 \times 10^{-14} \text{J}$ ✓
(OR $1.33 \times 10^{-14} \text{J}$) (5)
- 3.7 Taking photos of bones in hospitals ✓
Security checking/ metal detection ✓
To study crystal structure/X-ray crystallography
Detection of the growth of tumor/cancer
Detect alterations made to art work. (any two) (2)

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QUESTION 4

- 4.1.1 The **total electric charge of an isolated system remains constant** regardless of changes within the system./The **net charge of an isolated system remains constant** during any process. ✓✓ (2)
- 4.1.2 Diagram



Due to **polarization** ✓✓ negative charge is developed on the part of the ball near to the rod and positive charge is developed on the part of the ball that is away from the rod. The **ball moves toward the rod** ✓ (attraction) as **opposite charges attract.** ✓

+ charges on rod.	✓
Equal number of positive and negative charges shown on the ball.	✓
Negative charges of the ball near the rod.	✓
Positive charges on the ball shown away from the rod.	✓
Attraction shown using arrow or written in words./Attraction shown in the diagram by Ball coming nearer to the rod.	✓
Total for diagram	5

(9)

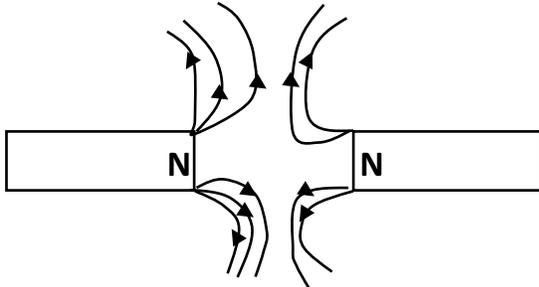
- 4.2.2 When the ball touches the rod, **electrons flow** ✓ **from the ball to the rod** ✓. The **ball now becomes positively charged** ✓. Ball moves away from the rod as **same charges repel** ✓. (4)
- 4.3.1 No charge/neutral ✓✓ (2)
- 4.3.2 Negative ✓✓ (2)

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QUESTION 5

- 5.1.1 South. ✓✓ (1)
- 5.1.2 North. ✓✓ (1)
- 5.1.3 South. ✓✓ (1)

5.2



Correct direction	✓
Correct shape (curved)	✓
Field lines do not cross	✓
Region with no field in between.	✓

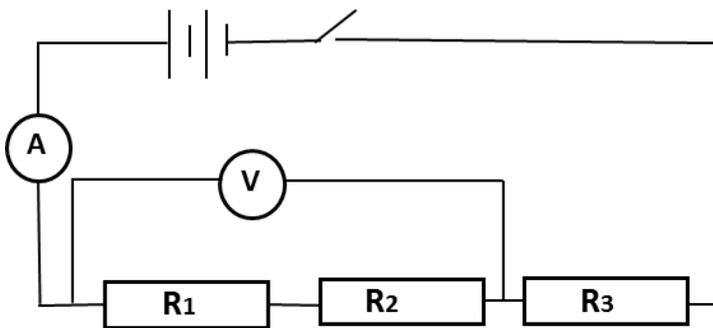
(4)

- 5.3 When **charged particles in the solar wind are trapped and spiral down (moves down or accelerates down) Earth's field lines** towards the poles, auroras are formed. ✓ When these **charged particles reach the ionosphere, they collide with the gases** ✓ there and **energize them(gives energy to them)** ✓ to produce **beautiful coloured spectacle** in the sky. ✓ (4)
- 5.4.1 `Magnetically clean` means the **absence** ✓ of **magnetic materials.** ✓ /The **absence** of considerable amounts of **magnetic materials.** Cities like Cape Town is not magnetically clean because they have **large structures** like **bridges/ large buildings/ railway tracks.** ✓ These **structures contain lots of magnetic material.** ✓ (4)
- 5.4.2 Iron (only name accepted) ✓✓ (2)
- 5.4.3 **Magnetism of the earth.** ✓✓ (2)

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QUESTION 6

- 6.1 The rate of flow of charge ✓✓ (2)
- 6.2.1 i. Ammeter connection ✓, connected across the battery. ✓
ii. Voltmeter connection ✓, connected in series with circuit. ✓ (4)
- 6.2.2



Two cells in series	✓
Switch in the circuit	✓
Three resistors in series	✓
Voltmeter across R ₁ and R ₂	✓
Ammeter connected in series	✓
All resistors labelled	✓
TOTAL	6

- 6.3 12V ✓✓ (2)
- 6.4 $V = W/Q$ ✓ and $Q = W/V = 3/24$ ✓ = 0.125 C ✓ (OR 0.13 C) (4)

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QUESTION 7

- 7.1 The potential difference (voltage measured) across the terminals of a battery when no current is flowing through the battery (when it is not connected to an external circuit or on open circuit) ✓✓ (2)
- 7.2.1 $R = (R_1 R_2) / (R_1 + R_2)$ ✓ = (6×4) ✓ $\div (6 + 4)$ ✓ = 2.4Ω ✓✓ (5)
- 7.2.2 $5 - 3 = 2 \text{ A}$ ✓✓ (2)
- 7.3.1 $R = (R_1 + R_2 + R_3)$ ✓ = $(5 + 7 + 8)$ ✓ = 20Ω ✓ (3)
- 7.3.2 reading on $V_3 = [4 - (1 + 1.6)]$ ✓ = 1.4 V ✓ (3)
- 7.3.3 0.2 A ✓✓ (2)
- 7.4 $I = Q / \Delta t$ ✓ = (48) ✓ $\div (120)$ ✓ = 0.4 A ✓ (4)

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TOTAL = 150