higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

PHYSICAL SCIENCE

(First paper)

NQF LEVEL 2

28 November 2024

This marking guideline consists of 9 pages.

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SECTION A

QUESTION 1

1.1 Voltmeter
1.2 Pulse
1.3 Mechanical
1.4 Repel
1.5 Low

(5 × 1) **[5]**

QUESTION 2

2.1 True✓✓
2.2 True✓✓
2.3 True✓✓
2.4 False✓✓
2.5 False✓✓

(5 × 2) **[10]**

QUESTION 3

3.1 F
3.2 E
3.3 G
3.4 A
3.5 D

(5 × 1) **[5]**

QUESTION 4

4.1 C✓✓✓
4.2 B✓✓✓
4.3 B✓✓✓
4.4 A✓✓✓
4.5 D✓✓✓

(5 × 3) **[15]**

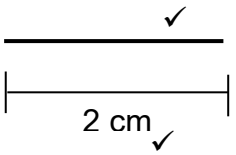
TOTAL SECTION A: 35

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SECTION B

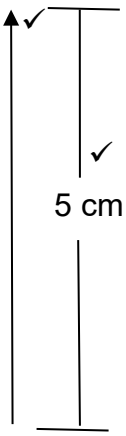
QUESTION 5: MEASUREMENT AND SCIENTIFIC INVESTIGATION

5.1 Scale: 50 m = 1 cm
100 m = 2 m



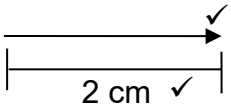
(2)

5.2 Scale: 100 N = 1cm
500 N = 5 cm



(2)

5.3 Scale: 100 m/s = 1 cm
200 m/s = 2cm



(2)
[6]

QUESTION 6: MOTION

6. 1 $v = u + at$ ✓
$5 = 0 + a(60)$ ✓
$a = 0{,}08\ m.s^{-1}$ ✓ (4)

6. 2 During the 3 minutes, the velocity of bumper car A is constant.
$v = u = 5\ m.s^{-1}$ ✓ (2)

6.3 During the last 1 minute, both bumper car A and car B are stationary.
$v = 0\ m.s^{-1}$ (1)

6.4 $v^2 = u^2 + 2as$
$5^2 = 0^2 + 2(0{,}08)s$ ✓
$s = 156{,}25\ m$
$S_1 = 156{,}25\ m$ ✓

$t = 3 \times 60$
$t = 180\ s$ ✓

$s = ut$
$s = (5)(180)$ ✓
$s = 900\ m$
$S_1 = 900\ m$ ✓

$S_{TOTAL} = S_1 + S_2$
$S_{TOTAL} = 156{,}25 + 900$ ✓
$S_{TOTAL} = 1056{,}25\ m$ ✓

$laps = \frac{1056{,}25}{500}$
$laps = 2{,}11$
$laps = 2$ ✓

OR
$S_{laps} = 500 + 500$
$S_{laps} = 1000m$
$laps = 2$

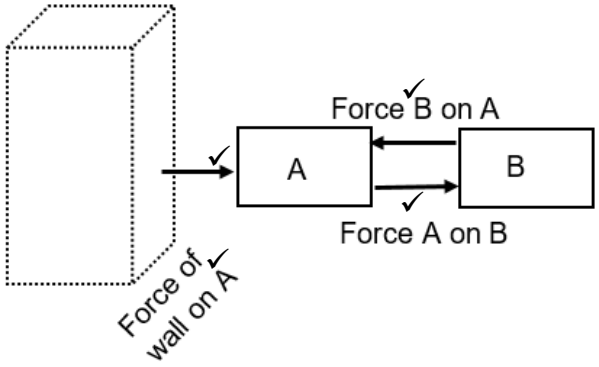
Because the driver covered 1056,25 m (8)

6.5 $E_K = \frac{1}{2}mv^2$ ✓

$E_K = \frac{1}{2}(100)(5)^2$ ✓✓

$E_K = 1250\ J$ ✓ (4)

6.6



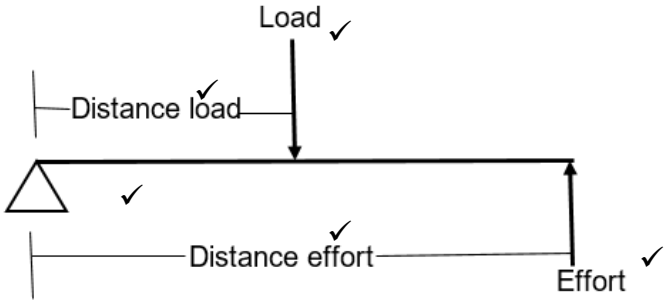
(4)

6.7 Contact force ✓✓ (2)

[25]

QUESTION 7: SIMPLE MACHINES

7.1



(5)

7.2 Second class (1)

7.3 7.3.1

$F(L) = mg$ ✓
$F(L) = 20 \times 9{,}8$ ✓
$F(L) = 196\ N$ ✓ (3)

7.3.2

$$IMA = \frac{S(E)}{S(L)} \checkmark$$

$$IMA = \frac{1{,}2}{0{,}5} \checkmark$$

$$IMA = 2{,}4 \checkmark$$

(4)

7.3.3

$$2{,}4 = \frac{F(L)}{F(E)} \checkmark$$

$$F(E) = \frac{196}{2{,}4} \checkmark$$

$F(E) = 81{,}67N$ ✓ (3)

7.3.4 $\eta = \frac{AMA}{IMA} \times 100\%$ ✓

$\eta = \frac{(196/81{,}67)}{2{,}4} \times 100\%$ ✓

$\eta = 100\%$ ✓ (3)

[19]

QUESTION 8: WAVES

8.1 8.1.1 Transverse wave✓✓ (2)

8.1.2 Perpendicular to the direction of the of the propagation of the wave.✓✓ (2)

8.1.3 Crest (1)

8.1.4 Trough (1)

8.5 8.5.1 $Amplitude = \frac{0{,}5}{2}$ ✓✓

$Amplitude = 0{,}25\ m$ ✓

8.5.2 $f = \frac{10}{60}$ ✓✓

$f = 0{,}17\ Hz$ ✓

8.5.3 $p = \frac{1}{f}$ ✓

$p = \frac{1}{0{,}17}$ ✓

$p = 5{,}88\ s$ ✓

(3 × 3) (9)

8.2 $v = f\lambda$ ✓

$\lambda = \frac{330}{20}$ ✓

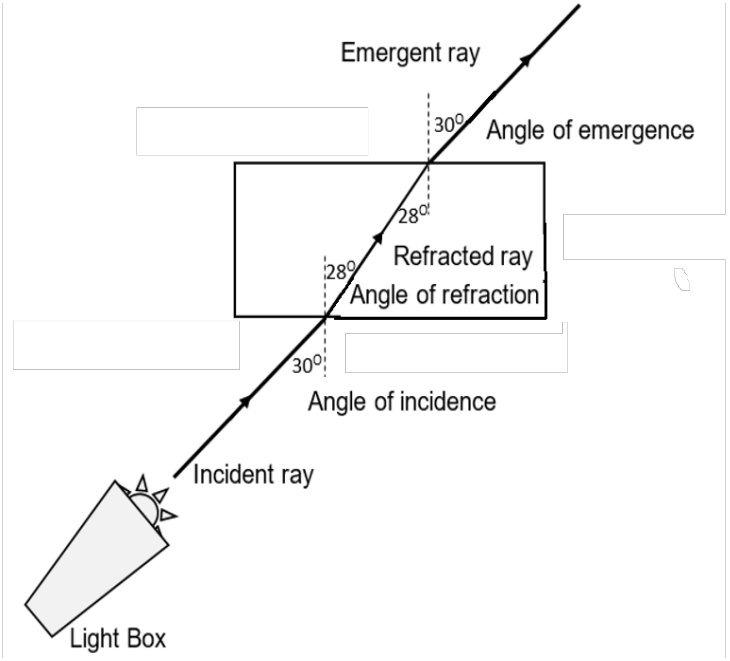
$\lambda = 16{,}5\ m$ ✓ (3)

8.3 Two pulses generated from the crest and trough approach from opposite✓ directions. Two pulses cancel the effect and resume after crossing. (2)

[20]

QUESTION 9: GEOMETRICAL OPTICS

9.1 9.1.1



Marking criteria	Marks
Correct direction and name for incident ray	1
Correct direction and name for refracted ray	1
Correct direction and name for emergent ray	1
Correct magnitude and position for angle of incidence	1
Correct magnitude and position for angle of refraction	1
Correct magnitude and position for the angle of emergence	1
Normal lines drawn at the correct position	1

(7)

9.1.2 Refraction✓ (1)

9.2 Angle of reflection✓ = 72°✓ (2)

[10]

QUESTION 10: MAGNETISM

10.1 10.1.1 A cloth is rubbed on the ruler.✓ The ruler is charged by the cloth.✓ The cloth transfers charges to the ruler.✓ (3)

10.1.2 Negative✓✓ (1)

10.1.3 At first, the pieces of paper are neutral with positive and negative polarity.✓ Negative charges on the ruler attract positive charges of the polarised pieces of paper.✓ The ruler and the pieces of paper touch.✓ (3)

10.1.4 Force of attraction✓✓ (2)

10.2 Negative charges on the ruler will transfer onto the attached pieces of paper.✓ Negative charges will move to the pieces of paper distributing negative charges onto the pieces of paper.✓ The same negative charges on the ruler and pieces of paper will push pieces of paper off the ruler and papers will drop.✓ (3)

[12]

QUESTION 11: ELECTRICITY

11.1 11.1.1

$$\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} \checkmark$$

$$\frac{1}{R_p} = \frac{1}{2} + \frac{1}{5} \checkmark$$

$$\frac{1}{R_p} = \frac{7}{10} \quad \checkmark \checkmark$$

$$R_p = 1{,}43\ \Omega \checkmark$$

OR

$$R_p = \frac{R_1 \times R_2}{R_1 + R_2}$$

$$R_p = \frac{2 \times 5}{2 + 5}$$

$$R_p = 1{,}43\ \Omega$$ (5)

11.1.2

$$R_T = R_p + R_3 \checkmark$$

$$R_T = 1{,}43 + 4 \quad \checkmark\checkmark$$

$$R_T = 4{,}43\ \Omega \checkmark$$ (4)

11.1.3

$$Emf = \overset{\checkmark}{1{,}5} + \overset{\checkmark}{1{,}5} + \overset{\checkmark}{1{,}5}$$

$$Emf = 4{,}5\ V \checkmark$$ (4)

11.2 $I = \frac{Q}{t}$ ✓

$I = \frac{20}{50}$ ✓✓

$I = 0{,}4\ A$ ✓ (4)

11.3
- Length of a conductor
- Resistivity OR Type of material of which a conductor is made
- Cross-sectional area OR Thickness
- Temperature of the wire (4)

11.4
- Battery
- Solar PV (2)

[23]

TOTAL SECTION B: 115
GRAND TOTAL: 150

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