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GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

PROVINCIAL EXAMINATION

NOVEMBER 2022

GRADE 10

MARKING GUIDELINES

PHYSICAL SCIENCES (PAPER 1)

8 pages

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QUESTION 1

1.1 A ✓✓ (2)

1.2 D ✓✓ (2)

1.3 B ✓✓ (2)

1.4 C ✓✓ (2)

1.5 B ✓✓ (2)

1.6 B ✓✓ (2)

1.7 C ✓✓ (2)

1.8 B ✓✓ (2)
[16]

QUESTION 2

2.1 Physical quantity with both magnitude and direction. ✓✓ (2)

2.2 2.2.1 50 m ✓✓ (2)

2.2.2 0 m ✓✓ (2)

2.2.3 Vector ✓ – It has magnitude, unit and direction. ✓ (2)
[8]

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QUESTION 3

3.1 $\frac{135\ km.h^{-1}}{3,6}$ ✓

$37,5\ m\cdot s^{-1}$ ✓ (2)

3.2 $vf = vi + a\Delta t$ ✓

$= 0$ ✓ $+ (1,5)(11,5)$ ✓

$= 17,25\ m\cdot s^{-1}$ ✓ (4)

3.3 $\Delta x = v_i\Delta t + \frac{1}{2}a\Delta t^2$ ✓

$= 0$ ✓ $+ \frac{1}{2}(1,5)(11,5)^2$ ✓

$= 99,19\ m$ ✓ (4)

3.4 $\Delta x = v_i\Delta t + \frac{1}{2}a\Delta t^2$ ✓

$40 = (37,5)(4)$ ✓ $+ \frac{1}{2}(a)(4)^2$ ✓

$a = -13,75\ m\cdot s^{-2}$ ✓ (4)

[14]

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QUESTION 4

4.1 The rate of change in velocity. ✓✓

OR

The change in velocity per unit time. ✓✓ (2)

4.2 4.2.1 – The car starts from rest and velocity increases to 10 $m \cdot s^{-1}$ in 20 seconds. ✓
– Constant positive acceleration or uniformly accelerated motion. ✓ (2)

4.2.2 – Velocity is constant (uniform). ✓
– Acceleration is zero. ✓ (2)

4.2.3 Car has stopped. ✓ Acceleration is zero. ✓ (2)

4.3 $a = m = \frac{y_2 - y_1}{x_2 - x_1}$ ✓

$= \frac{0 - 40}{60 - 50}$ ✓

$= -4$ ✓

$= 4\ m \cdot s^{-2}$, in the opposite direction or west (deceleration in opposite direction) ✓

OR

$v_f = v_i + a.\Delta t$ ✓

$\underline{0 = 40}$ ✓ $\quad a \times 10$ ✓

$\therefore a = -4$

$= 4\ m \cdot s^{-2}$, in the opposite direction or west (deceleration) ✓ (4)

4.4 BC ✓, Steeper slope. ✓ (2)

[14]

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QUESTION 5

5.1 Energy of an object as a result of its position/height above the surface of the Earth. ✓✓ (2)

5.2 $EM_A = mgh + mv^2$ ✓

$= (2 \times 9,8 \times 30) + \frac{1}{2} \times 2 \times 0^2$ ✓

$= 588 + 0$

$= 588$ J ✓ (3)

5.3 Total mechanical energy is conserved in an isolated system. ✓✓

OR

Mechanical energy at the top equals mechanical energy at the bottom in the absence of friction. ✓✓ (2)

5.4 **POSITIVE MARKING FROM QUESTION 5.2**

$EM_A = EM_B$ ✓

588 ✓ $= mgh + \frac{1}{2} + mv^2$

$588 = 2 \times 9,8 \times 10 + \frac{1}{2} \times 2\, v^2$ ✓

$588 - 196 = v^2$

$\therefore v = \sqrt{392}$

$= 19,80\ m \cdot s^{-1}$ ✓ (4)

5.5 EQUAL TO ✓. Mechanical energy is conserved. ✓ (2)

[13]

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QUESTION 6

6.1 A wave where the movement of particles of the medium is perpendicular to the direction of propagation of the wave. ✓✓ (2)

6.2 A – Trough ✓

B – Wavelength ✓

C – Crest ✓ (3)

6.3 $T = \frac{1}{f}$

$T = \frac{1}{30}$ ✓

= 0,03s ✓ (2)

6.4 No, ✓ two points in phase are separated by a complete number of wavelengths. or They are not separated by wavelength. ✓ (2)

6.5 $v = f \times \lambda$ ✓

$v = 30 \times 4$ ✓

$= 120\ m \cdot s^{-1}$ ✓ (3)

[12]

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QUESTION 7

7.1 Neutral charge – an atom that has equal number of electrons and protons. ✓✓ (2)

7.2 The net charge of an isolated system remains constant during any physical process. ✓✓ (2)

7.3 Due to polarisation, a negative charge is developed on the side of sphere **B** near sphere **A** and a positive charge is developed on the side of sphere **B** that is away from sphere **A** ✓. Sphere **B** moves towards sphere **A** (attraction) as opposite charges attract. ✓ (2)

7.4 $Q = n.e$ ✓

$Q = 20 \times (-1,6 \times 10^{-19})$ ✓

$Q = -3,2 \times 10^{-18}$ C ✓ (3)

7.5 $Qnet = \frac{Q1 + Q2}{2}$ ✓

$Qnet = \frac{\left(2 \times 10^{-9}\right) + \left(-3,2 \times 10^{-18}\right)}{2}$ ✓

$Qnet = 9,99 \times 10^{-10}$ C ✓ (3)

[12]

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QUESTION 8

8.1 7,5 v ✓ (1)

8.2 8.2.1 $\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$

$\frac{1}{R_p} = \frac{1}{6} + \frac{1}{4} + \frac{1}{3}$ ✓

$R_p = 1,3\ \Omega$
$R_T = R_s + R_p$

$\underline{R_T = 2,67 + 1,3}$ ✓

$R_T = 3,97\ \Omega$ (3)

8.2.2 $I = \frac{V}{R}$

$I = \frac{7,5}{3,97}$ ✓

$I = 1,88\ A$ ✓ (2)

8.2.3 $I = \frac{V}{R}$

$1,88 = \frac{V}{2,67}$ ✓

$V = 5,01\ V$ ✓ (2)

8.3 $I = \frac{Q}{t}$

$1,88 = \frac{Q}{360}$ ✓

$Q = 676,8\ C$ ✓ (3)
[11]

TOTAL: 100

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