

PROVINCIAL EXAMINATION
NOVEMBER 2022
GRADE 10
MARKING GUIDELINES

PHYSICAL SCIENCES (PAPER 1)

8 pages

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]**

QUESTION 3

$$3.1 \quad \frac{135 \text{ km}\cdot\text{h}^{-1}}{3,6} \checkmark$$

$$37,5 \text{ m}\cdot\text{s}^{-1} \checkmark \quad (2)$$

$$3.2 \quad v_f = v_i + a\Delta t \checkmark$$

$$= 0 \checkmark + (1,5)(11,5) \checkmark$$

$$= 17,25 \text{ m}\cdot\text{s}^{-1} \checkmark \quad (4)$$

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

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

$$= 99,19 \text{ m} \checkmark \quad (4)$$

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

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

$$a = -13,75 \text{ m}\cdot\text{s}^{-2} \checkmark \quad (4)$$

[14]

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 $10 \text{ m}\cdot\text{s}^{-1}$ 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 $a = m = \frac{y_2 - y_1}{x_2 - x_1}$ ✓

$$= \frac{0 - 40}{60 - 50} \quad \checkmark$$

$$= -4 \quad \checkmark$$

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

OR

$$v_f = v_i + a \cdot \Delta t \quad \checkmark$$

$$0 = 40 \quad \checkmark + a \times 10 \quad \checkmark$$

$$\therefore a = -4$$

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

4.4 BC ✓, Steeper slope. ✓ (2)

[14]

QUESTION 5

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

5.2 $EM_A = mgh + mv^2$ ✓
 $= (2 \times 9,8 \times 30) + \frac{1}{2} \times 2 \times 0^2$ ✓
 $= 588 + 0$
 $= 588 \text{ J}$ ✓ (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**

$$EM_A = EM_B \quad \checkmark$$

$$588 \quad \checkmark = mgh + \frac{1}{2} + mv^2$$

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

$$588 - 196 = v^2$$

$$\therefore v = \sqrt{392}$$

$$= 19,80 \text{ m}\cdot\text{s}^{-1} \quad \checkmark \quad (4)$$

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

[13]

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

$T = \frac{1}{30}$ ✓

$= 0,03\text{s}$ ✓

(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 $v = f \times \lambda$ ✓

$v = 30 \times 4$ ✓

$= 120 \text{ m} \cdot \text{s}^{-1}$ ✓

(3)

[12]

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 $Q = n.e$ ✓
- $Q = 20 \times (-1,6 \times 10^{-19})$ ✓
- $Q = -3,2 \times 10^{-18} \text{ C}$ ✓ (3)
- 7.5 $Q_{net} = \frac{Q_1 + Q_2}{2}$ ✓
- $Q_{net} = \frac{(2 \times 10^{-9}) + (-3,2 \times 10^{-18})}{2}$ ✓
- $Q_{net} = 9,99 \times 10^{-10} \text{ C}$ ✓ (3)

[12]

QUESTION 8

$$8.1 \quad 7,5 \text{ v } \checkmark \quad (1)$$

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

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

$$R_p = 1,3 \Omega$$

$$R_T = R_s + R_p$$

$$\underline{R_T = 2,67 + 1,3} \checkmark$$

$$R_T = 3,97 \Omega$$

(3)

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

$$I = \frac{7,5}{3,97} \checkmark$$

$$I = 1,88 \text{ A } \checkmark$$

(2)

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

$$1,88 = \frac{V}{2,67} \checkmark$$

$$V = 5,01 \text{ V } \checkmark$$

(2)

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

$$1,88 = \frac{Q}{360} \checkmark$$

$$Q = 676,8 \text{ C } \checkmark$$

(3)

[11]**TOTAL: 100**