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 $\dfrac{135\ km.h^{-1}}{3,6}$ ✓

  $37,5\ m{\cdot}s^{-1}$ ✓ (2)

3.2 $vf = vi + a\Delta t$ ✓

  $= 0$ ✓ $+ (1,5)(11,5)$ ✓

  $= 17,25\ m{\cdot}s^{-1}$ ✓ (4)

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

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

  $= 99,19\ m$ ✓ (4)

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

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

  $a = -13,75\ m{\cdot}s^{-2}$ ✓ (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 m·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
$$a = m = \frac{y_2 - y_1}{x_2 - x_1} \; ✓$$

$$= \frac{0 - 40}{60 - 50} \; ✓$$

$$= -4 \; ✓$$

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

OR

$$v_f = v_i + a.\Delta t \; ✓$$

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

$$\therefore a = -4$$

$= 4 \; m·s^{-2}$, 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 $EM_A = mgh + mv^2$ ✓

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

$= 588 + 0$

$= 588$ 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·s^{-1} ✓ (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 $T = \frac{1}{f}$

$T = \frac{1}{30}$ ✓

$= 0,03s$ ✓ (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]

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 <u>polarisation,</u> <u>a negative charge is developed on the side of sphere **B**</u> near sphere **A** and <u>a positive charge is developed on the side of sphere **B**</u> that is away from sphere **A** ✓. Sphere **B** moves <u>towards sphere **A** (attraction)</u> 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 $Qnet = \dfrac{Q1 + Q2}{2}$ ✓

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

$Qnet = 9{,}99 \times 10^{-10} \text{ C}$ ✓ (3)

[12]

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