Eastern Cape Physics September 2022: Errata

Question 3:

3.2.2

Upwards as positive:

$$\Delta y = v_i\,\Delta t = \tfrac{1}{2}\,a\,\Delta t^2$$

$$-8 = v_i\,(1{,}28 - 0{,}6) = \tfrac{1}{2}\,(-9{,}8)\,(1{,}28 - 0{,}6)^2$$

$$v_i = 8{,}432\ m.s^{-1}$$

3.4 Upwards as positive:

Positive value of velocity should be 11,29 and not 10,84 as indicated.

Downwards as positive:

Negative value of velocity should be -11,29 and not -10,84 as indicated.

Question 5:

5.5

Option 1:

$$W_{net} = \Delta E_k$$

$$W_F + W_f + W_{Fg} = E_{kf} - E_{ki}$$

$$F\,\Delta x\cos\theta + f\,\Delta x\cos\theta + mg\,\Delta x\,cos\theta = \tfrac{1}{2}\,m\,{v_f}^2 - 0$$

$$3600\ \times 12\ \times \cos\ \ 0° + 1540\ \times 12\ \times \cos 180° + (-8820) = \tfrac{1}{2} \times 75\ \times {v_f}^2$$

$${v_f}^2 = 424$$

$$\boldsymbol{v_f = 20{,}591\ m.s^{-1}}$$

Option 2:

$$W_{NC} = \Delta E_p + \Delta E_k$$

$$W_F + W_f = (E_{pf} - E_{pi}) + (E_{kf} - E_{ki})$$

$$F\,\Delta x \cos\theta + f\,\Delta x \cos\theta = (E_{pf} - E_{pi}) + ½\, m\,(v_f{}^2 - 0)$$

$$3600 \times 12 \times cos\,0° + 1540 \times 12 \times \cos 180° = (8820 - 0) + (\,½ \times 75 \times v_f{}^2 - 0)$$

$$v_f{}^2 = 424$$

$$\underline{v_f = 20{,}591\ m.s^{-1}}$$

Question 7:

7.3

$$E = \frac{kQ}{r^2}$$

$$E_1 = \frac{(9 \times 10^9)(10 \times 10^{-6})}{(0{,}1)^2}$$

$$E_1 = 9{,}00 \times 10^6 N.C^{-1}\ to\ the\ right$$

$$\overrightarrow{E_{net}} = \overrightarrow{E_1} + \overrightarrow{E_2}$$

Take left as positive

$$4{,}70 \times 10^6 = -9{,}00 \times 10^6 + \frac{9 \times 10^9}{(0{,}4)^2} \times Q$$

$$Q = 2{,}436 \times 10^{-4}\ C$$

Question 8:

8.1 Maximum energy provided by a battery per unit charge passing through it.

Die maksimum energie wat ‘n battery kan lewer per eenheidspositiewe lading wat daardeur vloei.

8.2.2

$$m = \frac{\Delta y}{\Delta x}$$

$$m = \frac{1{,}2 - 1{,}4}{2{,}5 - 0}$$

$$m = -0{,}08$$

But/Maar

$$m = -r$$

$$r = -(-0.08)$$

$$r = 0{,}08\,\Omega$$

Question 9:

The numbering is totally incorrect.

Question 10:

Correct answer for 10.5:

$$f = 1{,}772 \times 10^{16}\,Hz$$