

PHYSICAL SCIENCES GRADE 11

QUESTION 1

1.1 Inertia (1)

1.2 Presbyopia (1)

1.3 electric (or electrostatic) (1)

[3]

QUESTION 2

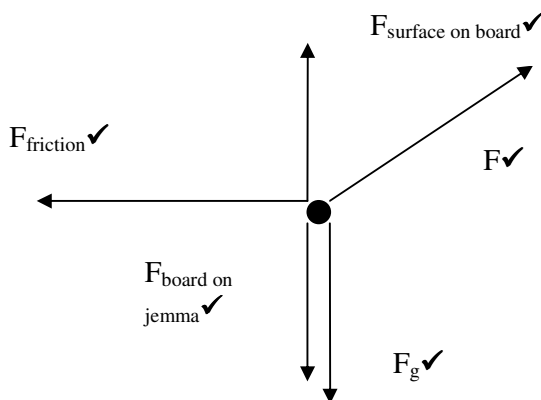
2.1	A	B	C	D
2.2	A	B	C	D
2.3	A	B	C	D
2.4	A	B	C	D
2.5	A	B	C	D
2.6	A	B	C	D

[6 X 2 = 12]

TOTAL SECTION A : 15

QUESTION 3

3.1



(4)

3.2 $F_x = F \cos \theta$ ✓
 $= 50 \times \cos 40^\circ$ ✓
 $= 38,3 \text{ N}$ ✓

(3)

3.3

$$\begin{aligned} F_{\text{net}} &= ma \quad \checkmark \\ F_{\text{x applied}} - F_{\text{friction}} &= ma \quad \checkmark \\ 38,3 - 9 \quad \checkmark &= (17+0,8)a \quad \checkmark \\ a &= 1,65 \text{ m}\cdot\text{s}^{-2} \quad \checkmark \end{aligned} \quad (5)$$

3.4 Due to the force of friction the board will slow down and stop \checkmark but because of Newtons 1st law \checkmark Jemma will continue moving forward. \checkmark (3)

[15]

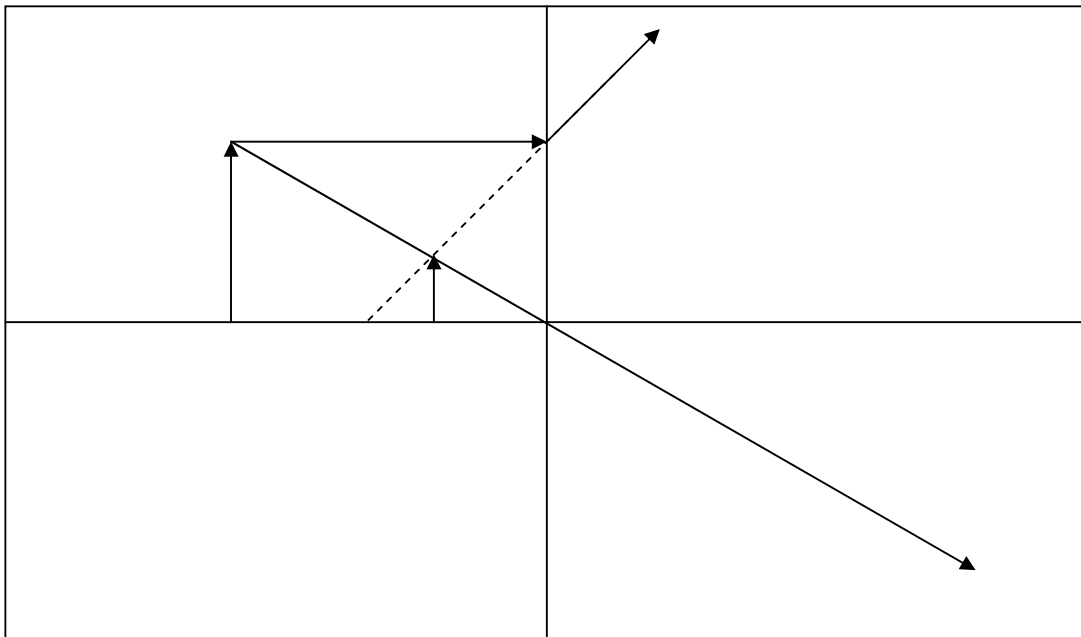
QUESTION 5

5.1.1) CONCAVE

5.1.2) Height = 2.1cm

Distance = 2.8cm

5.1.3)



5.1.4) 4,2 \rightarrow 4.4 cm

5.2.1) Longitudinal wave

5.2.2) B and D

5.2.3a) $v = f \times \lambda$ $\lambda = v/f = 340/20000 = 0.017m$

5.2.3b) Ultra-sound (baby in uterus)

[15]

QUESTION 5

$$5.1.1 \quad F = \frac{kQ_1Q_2}{r^2} \quad \checkmark$$
$$F = \frac{(9 \times 10^9)(10 \times 10^{-9})(-5 \times 10^{-9})}{0,05^2} \quad \checkmark$$

$$F = -1,80 \times 10^{-4} \text{ N} \quad \checkmark$$

$$F = 1,88 \times 10^{-4} \text{ N (attracting)}$$

$$5.1.2 \quad Q_{\text{new}} = \frac{Q_1 + Q_2}{2}$$

$$Q_{\text{new}} = \frac{(10 \times 10^{-9}) + (-5 \times 10^{-9})}{2} \quad \checkmark$$

$$Q_{\text{new}} = 2,5 \times 10^{-9} \text{ C} \quad \checkmark$$

$$5.1.3 \quad \# \text{ charge transferred} = Q_{\text{new}} - Q_{\text{old}} = 2,5 \times 10^{-9} - 10 \times 10^{-9} = -7,5 \times 10^{-9} \text{ C} \quad \checkmark$$

$$\# \text{ electrons} = -7,5 \times 10^{-9} / 1,6 \times 10^{-19} = 4,69 \times 10^{10} \text{ electrons} \quad \checkmark$$

5.1.4 B to A \checkmark

$$5.2.1 \quad U = \frac{kQ_1Q_2}{r} \quad \checkmark$$

$$U = \frac{9 \times 10^9 (-10 \times 10^{-9})(-5 \times 10^{-9})}{0,055} = 8,18 \times 10^{-6} \text{ J} \quad \checkmark$$

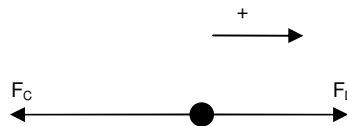
$$5.2.2 \quad E_{\text{net}} = E_D + E_C$$

$$E_{\text{net}} = \frac{kQ_1}{r^2} + \frac{kQ_2}{r^2} \quad \checkmark$$

$$E_{\text{net}} = 9 \times 10^9 \left(\frac{-10 \times 10^{-9}}{0,04^2} + \frac{-5 \times 10^{-9}}{0,015^2} \right) \quad \checkmark$$

$$E_{\text{net}} = -2,56 \times 10^5 \text{ N} \cdot \text{C}^{-1}$$

$$E_{\text{net}} = 2,56 \times 10^5 \text{ N} \cdot \text{C}^{-1} \text{ left} \quad \checkmark$$



(4)

[15]

TOTAL: 60 MARKS