

## Gr 12 Science Test Feb 2019 MEMO

- 1.1 C ✓✓  
 1.2 A ✓✓  
 1.3 B ✓✓  
 1.4 A ✓✓  
 1.5 D ✓✓  
 1.6 A ✓✓  
 1.7 B ✓✓  
 1.8 A ✓✓  
 1.9 A ✓✓

- 2.1 When a resultant/net force acts on an object, the object will accelerate in the direction of the force at an acceleration that is directly proportional to the force ✓ and inversely proportional to the mass of the object. ✓

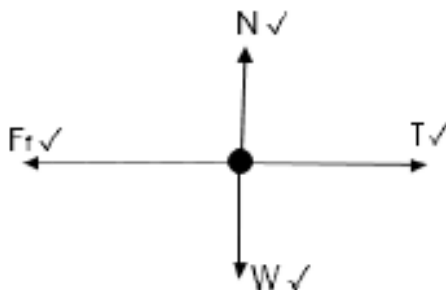
*Wanneer 'n resulterende/netto krag op 'n voorwerp inwerk, versnel die voorwerp in die rigting van die krag teen 'n versnelling direk eweredig aan die krag en omgekeerde eweredig aan die massa van die voorwerp.*

OR/OF

The net force acting on an object is equal to the rate of change of momentum ✓✓ of the object (in direction of the force). (2 or 0)

*Die netto krag wat op 'n voorwerp inwerk is gelyk aan die tempo van verandering in momentum van die voorwerp (in die rigting van die krag). (2 of 0) (2)*

2.2



Accepted labels/Aanvaarde byskrifte	
N	$F_N$ / $F_{normal}$ /Normal $F_N$ / $F_{normaal}$ /Normaal
T	$F_T$ /Tension $F$ /Spanning
w	$F_g$ / $F_w$ /weight/mg/gravitational force $F_g$ / $F_w$ /gewig/mg/gravitasiekrag
$F_f$	$f$ / friction $f$ /wrywing

### Notes/Aantekeninge:

- Mark awarded for label and arrow/  
*Punt toegeken vir byskrif en pyltjie*
- Do not penalize for length of arrows since drawing is not to scale/  
*Moenie vir lengte van die pyltjie penaliseer nie aangesien die tekeninge nie volgens skaal is nie*
- Any other additional force(s)/  
*Enige addisionele krag(te) (-1 mark/punt)*
- If force(s) do not make contact with the body/  
*Indien krag(te) nie met voorwerp kontak maak nie (-1 mark/punt)*
- If arrows are omitted but correctly labelled/  
*Indien pyltjies weggelaat is maar korrek benoem. (-1 mark/punt) (4)*

2.3 On/Op 6 kg:

$$\left. \begin{array}{l} F_{\text{net}} = ma \\ F_g + (-T) = ma \end{array} \right\} \checkmark$$

$$\frac{(6 \times 9,8) \checkmark - T}{58,8 - T} = 6 \times a$$

$$T = 58,8 - 6a \quad (1)$$

On/Op 4 kg:

$$\left. \begin{array}{l} F_{\text{net}} = ma \\ (-f) + T = ma \end{array} \right\} \checkmark \text{ any onelenige een}$$

$$\frac{(-32,53) \checkmark + T}{-32,53 + T} = \frac{4 \times a}{32,53 + 4a}$$

$$T = 32,53 + 4a \quad (2)$$

$$(1) - (2): \quad 0 = (58,8 - 6a) - (32,53 + 4a) \checkmark$$

$$a = 2,63 \text{ m}\cdot\text{s}^{-2} \checkmark \quad (6)$$

2.4 Positive marking from QUESTION 2.3/

Positiewe nasien vanaf VRAAG 2.3:

$$\left. \begin{array}{l} f_k = \mu_k N \\ f_k = \mu_k mg \end{array} \right\} \checkmark \text{ any onelenige een}$$

$$32,53 = \mu_k \times 4 \times 9,8 \checkmark$$

$$\mu_k = 0,83 \checkmark \quad (3)$$

3.

The magnitude of the electrostatic force exerted by one point charge ( $Q_1$ ) on another point charge ( $Q_2$ ) is directly proportional to the product of the magnitudes of the charges  $\checkmark$  and inversely proportional to the square of the distance ( $r$ )  $\checkmark$  between them.

*Die grootte van die elektrostatiese krag wat uitgeoefen word deur een puntlading ( $Q_1$ ) op 'n ander puntlading ( $Q_2$ ) is direk eweredig aan die produk van die grootte van die ladings en omgekeerd eweredig aan die kwadraat van die afstand ( $r$ ) tussen hulle* (2)

$$F = \frac{kQ_1Q_2}{r^2} \checkmark$$

$$F_{Q1 \text{ and } e^-} = \frac{(9 \times 10^9)(1 \times 10^{-6})(1,6 \times 10^{-19})}{(0,04)^2} \checkmark = 9 \times 10^{-13} \text{ N towards/na } Q_1$$

$$F_{Q2 \text{ and } e^-} = \frac{(9 \times 10^9)(2 \times 10^{-6})(1,6 \times 10^{-19})}{(0,06)^2} \checkmark = 8 \times 10^{-13} \text{ N towards/na } Q_2$$

$$F_{\text{net/netto}} = 9 \times 10^{-13} - 8 \times 10^{-13} \checkmark = \underline{1 \times 10^{-13} \text{ N towards/na } Q_1} \checkmark \quad (5)$$

[7]