

**POSSIBLE ANSWERS**  
**FEB / MARCH 2007**

**QUESTION 1 / VRAAG 1**

1.1	B	1.2	D	1.3	B	1.4	C	1.5	D
1.6	A	1.7	B	1.8	D	1.9	B	1.10	C
1.11	D	1.12	A	1.13	D	1.14	C	1.15	B

[15 x 3 = 45]

**QUESTION 2 / VRAAG 2**

2.1

Three forces which are in equilibrium can be represented in magnitude and direction by the three sides of a triangle taken in order.  
Drie kragte wat in ewewig is kan in grootte en rigting voorgestel word as die drie sye van 'n driehoek in volgorde geplaas.

(3)

**2.2 BY CALCULATION / MET BEHULP VAN BEREKENING**

$F_g = 1\,200 \cdot \tan 60^\circ$   
 $= 2\,078,46 \text{ N}$   
 $\therefore m = 207,85 \text{ kg}$

$F_g = \frac{1200 \cdot \sin 60^\circ}{\sin 30^\circ}$   
 $= \frac{1200 \times \sin 60^\circ}{\sin 30^\circ}$   
 $= 2\,078,46 \text{ N}$   
 $\therefore m = 207,85 \text{ kg}$

**BY CONSTRUCTION / MET BEHULP VAN KONSTRUKSIE EN METING**

- ✓ 1 200 N force / krag (6 cm)
- ✓ 90° angle / hoek
- ✓ 60° angle / hoek
- ✓ completion of triangle / voltooi van driehoek
- ✓  $F_{\text{chain}} = 10,4 \text{ cm} (\pm 2 \text{ mm})$
- ✓ conversion = 2 080 N ( $\pm 40 \text{ N}$ ) / omskakeling
- ✓ calculation of mass / berekening van massa (200,4 – 212,0 kg)

(7)

2.3

$F_{\text{horizontal}}$  increases /  $F_{\text{horisontaal}}$  neem toe ✓  
 $F_{\text{gravity}}$  remains the same /  $F_{\text{gravitasie}}$  bly dieselfde ✓  
 $\therefore F_{\text{chain}}$  (hypotenuse in the triangle above) increases /  $F_{\text{ketting}}$  (skuinssy in die driekhoek hierbo) neem toe ✓

$\sin\theta = \frac{F_{\text{gravity}}}{F_{\text{chain}}}$  ✓

If  $\theta$  decreases / as  $\theta$  toeneem } ✓  
 while  $F_{\text{gravity}} = k$  /  $F_{\text{gravitasie}} = k$  } ✓  
 $\Rightarrow \sin\theta$  decreases /  $\sin\theta$  neem af

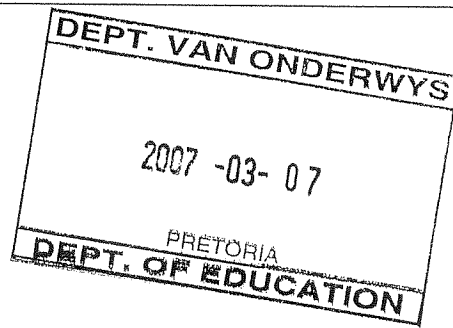
$\therefore F_{\text{chain}}$  increases /  $F_{\text{ketting}}$  neem toe ✓

(3)  
[13]

**QUESTION 3 / VRAAG 3**

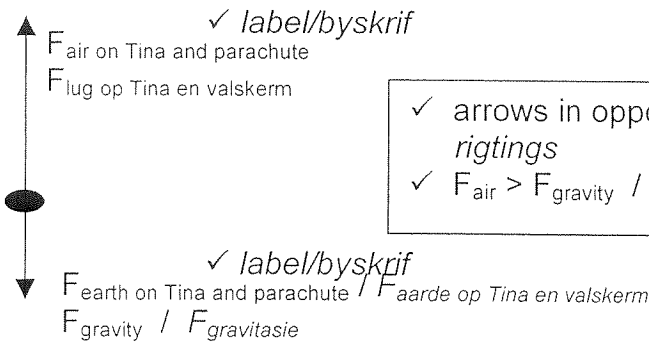
3.1

$v = u + at$  ✓  
           ✓      ✓   ✓  
 $= 0 + (10)(3)$   
 $= 30 \text{ m.s}^{-1}$  ✓



(5)

3.2



✓ arrows in opposite directions / pyle in teenoorgestelde rigtings  
 ✓  $F_{\text{air}} > F_{\text{gravity}}$  /  $F_{\text{lug}} > F_{\text{gravitasie}}$

(4)

3.3

When a non-zero resultant force acts on an object, the object accelerates in the direction of the resultant force. This acceleration is directly proportional to the resultant force and inversely proportional to the mass.

*Wanneer 'n nie-nul resulterende krag op 'n voorwerp inwerk, versnel die voorwerp in die rigting van die resulterende krag. Die versnelling is direk eweredig aan die resulterende krag en omgekeerd eweredig aan die massa van die voorwerp.*

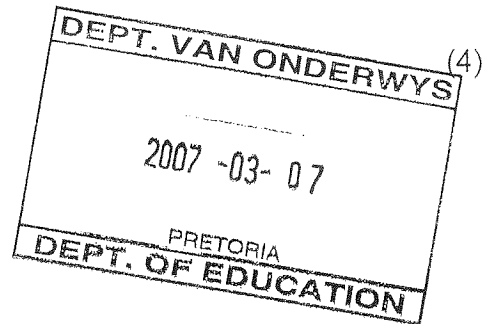
(3)

3.4

$$\begin{aligned}
 a &= \frac{F_{\text{res}}}{m} \quad \checkmark \\
 &= \frac{156}{65} \quad \checkmark \\
 &= 2,4 \text{ m.s}^{-2} \quad \checkmark
 \end{aligned}$$

3.5 upward positive / opwaarts as positief

$$\begin{aligned}
 F_{\text{res}} &= F_{\text{air/lug}} + F_g \quad \checkmark \\
 156 &= F_{\text{air/lug}} + (65)(-10) \quad \checkmark \\
 F_{\text{air/lug}} &= 806 \text{ N} \quad \checkmark
 \end{aligned}$$



downward positive / afwaarts as positief

$$\begin{aligned}
 F_{\text{res}} &= F_{\text{air/lug}} + F_g \quad \checkmark \\
 -156 &= F_{\text{air/lug}} + (65)(10) \quad \checkmark \\
 F_{\text{air/lug}} &= 806 \text{ N} \quad \checkmark
 \end{aligned}$$

OR / OF

$$\begin{aligned}
 F_{\text{res}} &= F_{\text{air/lug}} - F_g \quad \checkmark \\
 156 &= F_{\text{air/lug}} - (65)(10) \quad \checkmark \\
 F_{\text{air/lug}} &= 806 \text{ N} \quad \checkmark
 \end{aligned}$$

(4)  
[20]**QUESTION 4 / VRAAG 4**

4.1

Maximum constant velocity with which an object falls. ✓✓  
 Maksimum konstante snelheid waarteen 'n voorwerp val. ✓✓

(2)

4.2

$$\begin{aligned}
 \Delta p &= m(v - u) \quad \checkmark \\
 &= (0,0015)[4,5 - (-6,2)] \quad \checkmark \quad \checkmark \\
 &= 0,016 \text{ kg.m.s}^{-1}, \text{ upwards / opwaarts} \quad \checkmark
 \end{aligned}$$

Upward +ve  
Opwaarts +ve

(6)

4.3

$$E_k = \frac{1}{2}mv^2 = \frac{1}{2}(0,0015)(6,2)^2 = 0,029 \text{ J}$$

(4)

4.4

Changes to sound and heat energy. ✓✓ / Verander in warmte en klank ✓✓  
 Deformation of roof and hailstone / Vervorming van dak en haelstene

(2)  
[14]

**QUESTION 5 / VRAAG 5**

5.1 Rate at which work is done ✓✓ / Tempo waarteen arbeid verrig word ✓✓  
 [2 or 0 marks / punte] (2)

5.2 
$$W = Pt = (363)(2) = 726 \text{ J}$$
 (4)

5.3 
$$\Delta E_k = \frac{1}{2}m(v^2 - u^2) = W$$
  

$$\frac{1}{2}(3)(v^2 - 0) = 726$$
  

$$v = 22 \text{ m.s}^{-1}$$
 (5)

$$\Delta E_k = \frac{1}{2}mv^2 = W$$
  

$$\frac{1}{2}(3)v^2 = 726$$
  

$$v = 22 \text{ m.s}^{-1}$$
 (3/5)

5.4 
$$v = u + at$$
  

$$22 = 0 + a(2)$$
  

$$a = 11 \text{ m.s}^{-2}$$
 (5)

5.5 
$$v^2 = u^2 + 2as$$
  

$$22^2 = 0 + 2(11)s$$
  

$$s = 22 \text{ m}$$
 (5)

$$s = ut + \frac{1}{2}at^2$$
  

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

$$= 22 \text{ m}$$
 (5)

$$s = \left(\frac{u+v}{2}\right)t$$
  

$$= \left(\frac{0+22}{2}\right)(2)$$
  

$$= 22 \text{ m}$$
 (5)

[21]

**QUESTION 6 / VRAAG 6**

6.1 
$$V = \frac{W}{Q}$$
  

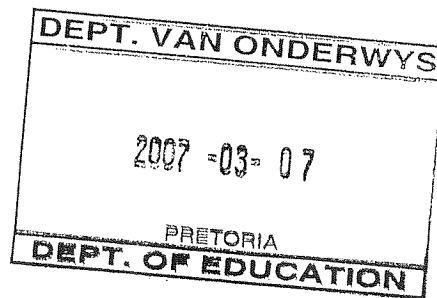
$$220000 = \frac{W}{4,5}$$
  

$$W = 9,9 \times 10^5 \text{ J}$$
 (4)

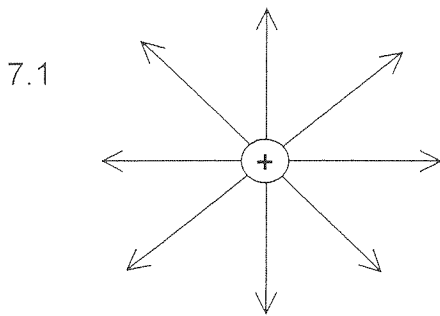
6.2 
$$Q = It$$
  

$$4,5 = I(0,005)$$
  

$$I = 900 \text{ A}$$
 (4)



(4)  
 [8]

**QUESTION 7 / VRAAG 7**

- ✓ direction of arrows / *rigting van pylpunte*
- ✓ distribution of field lines / *verspreiding van veldlyne*  
(evenly distributed field lines)  
(*eweredige verspreiding van veldlyne*)
- ✓ straight lines touching sphere + no lines inside the ball  
*/ reguit lyne wat sfeer raak + geen lyne binne sfeer*

(3)

7.2

Electric field strength at a point in an electric field is the force a unit positive point charge experiences when placed at that point in the electric field.

*Elektriese veldsterkte by 'n punt in 'n elektriese veld word gedefinieer as die krag wat 'n positiewe eenheidslading ondervind as dit by daardie punt in die elektriese veld geplaas word.*

(3)

7.3

$$\begin{aligned}
 E &= \frac{kQ}{r^2} \quad \checkmark \\
 &= \frac{(9 \times 10^9)(4 \times 10^{-9})}{(0,5)^2} \quad \checkmark \\
 &= 144 \text{ N.C}^{-1} \quad \checkmark
 \end{aligned}$$

(4)

**[10]**

DEPT. VAN ONDERWYS

2007 -03- 07

PRETORIA

DEPT. OF EDUCATION

**QUESTION 8/ VRAAG 8**

8.1

The potential difference across a resistor is directly proportional to the current in it provided the temperature remains the same. ✓✓

OR

The ratio of potential difference to current is a constant provided the temperature remains the same. ✓

Die potensiaalverskil oor 'n resistor is direk eweredig aan die stroom in die resistor as die temperatuur konstant bly. ✓✓

OF

Die verhouding van potensiaalverskil tot stroom in 'n resistor is konstant mits die temperatuur konstant bly. ✓✓

(3)

8.2 12 V ✓✓

(2)

8.3 0 V ✓✓

(2)

8.4

$$\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2}$$

$$= \frac{1}{3} + \frac{1}{6}$$

$$R_p = 2\Omega$$

$$R_p = \frac{\text{product}}{\text{sum}}$$

$$= \frac{3 \times 6}{3 + 6}$$

$$= 2\Omega$$

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

$$R_p = 2\Omega$$

(2/4)

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

$$R_p = 2\Omega$$

(0/4)

(4)

8.5

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

$$(2+8) = \frac{12}{I}$$

$$I = 1,2\text{A}$$

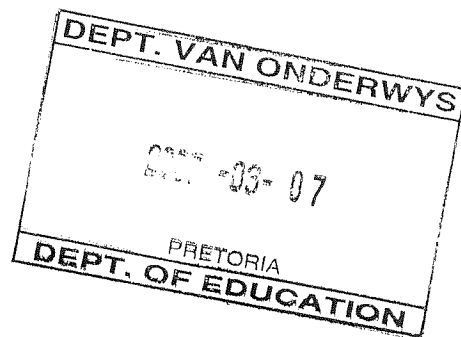
(5)

8.6

$$V_2 = V_p = IR_p$$

$$= (1,2)(2)$$

$$= 2,4\text{V}$$



(3)

[19]