



## Education and Sports Development

Department of Education and Sports Development  
Department van Onderwys en Sport Ontwikkeling  
Lefapha la Thuto le Tlhabololo ya Metshameko  
**NORTH WEST PROVINCE**

**NATIONAL SENIOR CERTIFICATE /  
NASIONALE SENIOR SERTIFIKAAT**

**GRADE 10  
GRAAD10**

**TECHNICAL SCIENCE**

**TEGNIJSE WETENSKAP**

**JUNE 2018 MEMORANDUM**

**JUNIE 2018 MEMORANDUM**

**MARKS/PUNTE : 150**

This memorandum consists of 8 pages.  
*Hierdie memorandum bestaan uit 8 bladsye.*



**QUESTION 1 (MULIPLE CHOICE) /VRAAG 1 (VEELVULDIGE KEUSEVRAE)**

1.1	B ✓✓	(2)
1.2	D ✓✓	(2)
1.3	C ✓✓	(2)
1.4	B ✓✓	(2)
1.5	A ✓✓	(2)
1.6	C ✓✓	(2)
1.7	C ✓✓	(2)
1.8	A ✓✓	(2)
1.9	B ✓✓	(2)
1.10	B ✓✓	(2)
		<b>[20]</b>

**QUESTION/VRAAG 2**

2.1	H ✓✓	(2)
2.2	E ✓✓	(2)
2.3	I ✓✓	(2)
2.4	E ✓✓	(2)
2.5	A ✓✓	(2)
2.6	L ✓✓	(2)
2.7	B ✓✓	(2)
2.8	F ✓✓	(2)
		<b>[16]</b>

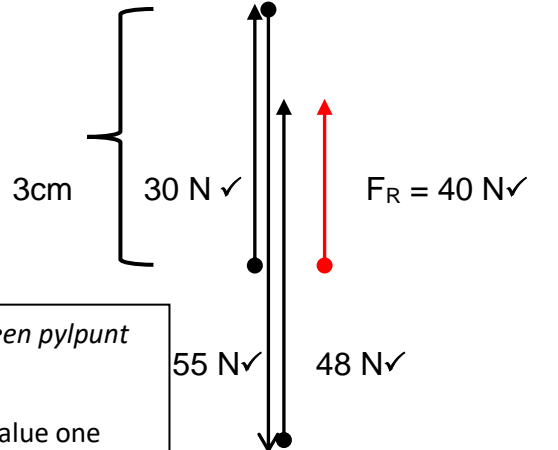
**QUESTION/VRAAG 3** Vectors / *Vektore*

3.1	$v = \frac{d}{\Delta t} \checkmark$ $= 1500 \checkmark / 240,7 \checkmark$ <div style="border: 1px solid black; padding: 5px; margin: 10px 0;">                 subst. 1 mark. change to sec. 1 mark.                  Verv. 1 punt. verander na sek. 1 punt.             </div> $= 6,23 \text{ m.s}^{-1} \checkmark$ Ans ✓ Unit (One mark each/ <i>Een punt elk</i> )	(5)
3.2.1	$v_f \rightarrow$ final velocity / <i>eindsnelheid</i> $\text{m.s}^{-1} \checkmark$	(1)



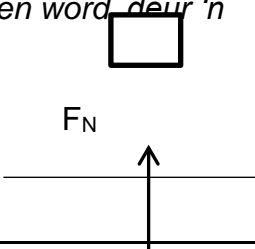
3.2.2	$v_i \rightarrow$ initial velocity / <i>beginsnelheid</i> m.s <sup>-1</sup> ✓	(1)												
3.2.3	$t \rightarrow$ time / <i>tyd</i> s ✓	(1)												
3.2.4	$a \rightarrow$ acceleration / <i>versnelling</i> m.s <sup>-2</sup> ✓	(1)												
3.3.1	$T = \frac{1}{f} \checkmark = \frac{1}{50} = 0,02 \text{ s} \checkmark$ <div style="border: 1px solid black; padding: 5px; display: inline-block;">                     Both formula and subst. 1 mark. Ans. 1 mark. /  <i>Beide formule en verv. 1 punt. Antw. 1 punt.</i> </div>	(2)												
3.3.2	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th style="text-align: center;">Lint A</th> <th style="text-align: center;">Lint B</th> <th style="text-align: center;">Lint C</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;"><b>Snelheid / Velocity</b></td> <td style="text-align: center;">Increase/ <i>toeneem</i> ✓</td> <td style="text-align: center;">Constant/ <i>konstant</i> ✓</td> <td style="text-align: center;">Decrease/ <i>verminder</i> ✓</td> </tr> <tr> <td style="text-align: center;"><b>Versnelling/ Acceleration</b></td> <td style="text-align: center;">Constant/ <i>konstant</i> ✓</td> <td style="text-align: center;">None/ <i>geen</i> ✓</td> <td style="text-align: center;">Constant/ <i>konstant</i> ✓</td> </tr> </tbody> </table>		Lint A	Lint B	Lint C	<b>Snelheid / Velocity</b>	Increase/ <i>toeneem</i> ✓	Constant/ <i>konstant</i> ✓	Decrease/ <i>verminder</i> ✓	<b>Versnelling/ Acceleration</b>	Constant/ <i>konstant</i> ✓	None/ <i>geen</i> ✓	Constant/ <i>konstant</i> ✓	1 each/ 1 elk (6)
	Lint A	Lint B	Lint C											
<b>Snelheid / Velocity</b>	Increase/ <i>toeneem</i> ✓	Constant/ <i>konstant</i> ✓	Decrease/ <i>verminder</i> ✓											
<b>Versnelling/ Acceleration</b>	Constant/ <i>konstant</i> ✓	None/ <i>geen</i> ✓	Constant/ <i>konstant</i> ✓											
3.4.1	Force of gravity is the force of attraction exerted by the earth on an object. Gravitasiëkrag is die aantrekkingskrag wat deur die aarde op 'n voorwerp uitgeoefen word ✓	(2)												
3.4.2	<div style="border: 1px solid black; padding: 5px; display: inline-block;">                     1 mark for correct diagram/ 1 punt vir korrekte diagram.                       1 mark for both labels/ 1 punt vir al twee byskrifte.                 </div> <p>w or/of <math>F_g</math> Force of gravity/ <i>Gravitasiëkrag</i>  <math>F_T</math> or/of <math>T</math> Tension / <i>Spankrag</i></p> <div style="text-align: center;"> </div>	(2)												
3.4.3	$F_g = mg$  $= (0,5 \checkmark \times 1200\text{kg}) \times (9,8)$  $= 5880 \text{ N downwards / afwaarts} \checkmark$  $\Delta x = (4 \checkmark \times 2,5\text{m}) = 10\text{m downwards / afwaarts}$  $W = F \cdot \Delta x$  $= 5880 \times 10 \checkmark$  $= 58800 \text{ J} \checkmark$	(5)												
3.5	$R = x_1 + x_2 - x_3 \checkmark$	(4)												



3.6	<p><math>R = 4,3 + 5,8 - 3\checkmark</math></p> <p><math>= 7,1 \text{ cm}\checkmark \text{ SE / SO}\checkmark</math></p> <p>Skaal 10 mm = 10 N<math>\checkmark</math></p> <p>Scale 10 m m = 10 N</p>  <div data-bbox="239 705 805 952" style="border: 1px solid black; padding: 5px;"> <p>No cursor shown, no marks. / <i>Geen pylpunt aangedui geen punte.</i></p> <p>Correct direction with correct value one mark each. / <i>rigting en waarde korrek een punt elk.</i></p> </div>	(5)
-----	---	-----

[ 35 ]

**QUESTION/VRAAG 4** Forces / *Kragte*

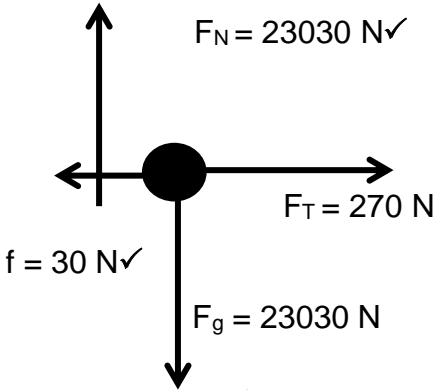
4.1	<p>A normal force <math>F_N</math>, is the perpendicular<math>\checkmark</math> force exerted by a surface on an object that lies on<math>\checkmark</math> that surface./</p> <p><i>Normaalkrag , <math>F_N</math> , is die krag wat loodreg<math>\checkmark</math> uitgeoefen word deur 'n oppervlak op 'n voorwerp wat op<math>\checkmark</math> die vlak lê.</i></p>  <p>(Cursor from surface <math>\perp</math> / <i>Pyl vanaf oppervlak <math>\perp</math>)<math>\checkmark</math></i></p>	(3)
-----	---	-----

4.2		<p><b>Examples of contact forces / Voorbeelde van kontakkrigte</b></p>	<p><b>Examples of contact forces / Voorbeelde van nie-kontakkrigte</b></p>	(6)
	4.2.1	<p><i>Wrywingskrag /</i></p> <p>Friction force<math>\checkmark</math></p>	4.2.4	<p><i>Magnetiese kragte /</i></p> <p>Magnetic forces<math>\checkmark</math></p>
	4.2.2	<p><i>Normaalkrag /</i></p>	4.2.5	<p><i>Elektrostatiese kragte /</i></p>



		Normal force✓		Electrostatic forces✓	
	4.2.3	<i>Spankrag / Tension</i> ✓	4.2.6	<i>Gravitasiekrag / Force of gravity</i> ✓	
		<i>Lugweerstand /</i> Air resistance ✓ (Alt)			
		<i>Veerkrags /</i> Spring force ✓ (Alt)			
4.3	$F_r = F_1 - F_2 + F_3 \checkmark$ $= 28 - 36 + 42 \checkmark$ $= 34 \text{ N } \textit{Suidoos / South east}$ ✓ $F_E \textit{ of/or Ekwilibrante krag/Equilibrant force}$ $= 34 \text{ N } \textit{Noordwes / North west}$ ✓				(4)
4.4.1	$F_g = mg$ $= (2350) \cdot (9,8) \checkmark$ $= 23030 \text{ N } \textit{afwaarts / downwards}$ ✓				(2)
					<div style="border: 1px solid black; padding: 5px; width: fit-content;">                 Forces should shown value,unit and direction. Without one of the three - lose 1 mark./   <i>Kragte moet waarde,eenheid en rigting aandui. Sonder een van die drie- verloor een punt.</i> </div>
					<div style="border: 1px solid black; padding: 5px; width: fit-content;">                 Subst. ✓ ans. ✓                   Force should shown value,unit and direction. Without one of the three lose 1 mark./   <i>Vervanging✓ antw✓.Krag moet waarde,eenheid en rigting aandui. Sonder een van die drie- verloor een punt.</i> </div>

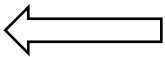


<p>4.4.2</p>	 <p> <math>F_N = 23030 \text{ N} \checkmark</math>  <math>F_T = 270 \text{ N}</math>  <math>f = 30 \text{ N} \checkmark</math>  <math>F_g = 23030 \text{ N}</math> </p> <p> <math>F_g \rightarrow</math> <i>Gravitasiekrag / Force of gravity</i> <math>\checkmark</math>  <math>F_T \rightarrow</math> <i>Toegepaste krag / Applied force</i> <math>\checkmark</math>  <math>F_N \rightarrow</math> <i>Normaalkrag / Normal force</i> <math>\checkmark</math>  <math>f \rightarrow</math> <i>Wrywingskrag/ Frictional force</i> <math>\checkmark</math> (shown on surface / <i>op oppervlak aangedui.</i>)         </p>	<p>(6)</p>
		<p>[21]</p>
<p><b>QUESTION/VRAAG 5: Moments and Energy / Momente en Energië</b></p>		
<p>5.1</p>	<p>Moment of a force about a point is defined as the turning effect <math>\checkmark</math> of the force about that point <math>\checkmark</math> /  <i>Moment van 'n krag om 'n punt word gedefinieer as die draai-effek <math>\checkmark</math> van die krag om die spesifieke punt. <math>\checkmark</math></i> </p>	<p>(2)</p>
<p>5.2</p>	<p> <math>\tau = F \times r_{\perp} \checkmark</math>  <math>= 1200 \times 2,5 \checkmark</math>  <math>= 3000 \text{ N.m} \checkmark</math> <i>anti kloksgewys/ anticlockwise</i> <math>\checkmark</math> </p>	<p>(4)</p>
<p>5.3</p>	<p> <math>\sum \tau_{\text{antikloksgewys}} = \sum \tau_{\text{kloksgewys}} \checkmark</math>      or / of      <math>\sum \tau_{\text{anticlockwise}} = \sum \tau_{\text{clockwise}}</math>  <math>F_A \times r_{\perp} = F_B \times r_{\perp} \checkmark</math>  <math>F_A \times 2 = 40 \times 4 \checkmark</math>  <math>F_A = 80 \text{ N}</math> <i>afwaarts / downwards</i> <math>\checkmark</math> </p>	<p>(4)</p>
<p>5.4</p>	<p><i>'n Kantelbalk is 'n enkele balk <math>\checkmark</math> wat op die een punt vasgemaak is terwyl die ander punt kan beweeg <math>\checkmark</math> /</i>  <i>Cantilever is a beam where one end is fixed <math>\checkmark</math> and one end is free to move. <math>\checkmark</math></i> </p>	<p>(2)</p>
<p>5.5.1</p>	<p> <math>MV = \frac{\text{Magsarm}}{\text{Lasarm}} \checkmark</math>      or      <math>MA = \frac{e}{l}</math>  <math>= \frac{2,8}{0,03} \checkmark \checkmark</math>  <math>= 93,33 \checkmark</math> </p>	<p>(4)</p>



5.5.2	$MV = \frac{las}{mag}$ $93,33 = \frac{las}{355} \checkmark$ $Las = 93,33 \times 355$ $= 33132,15 \text{ N} \checkmark$ $w = mg$ $33132 = m \times 9,8$ $m = 3380 \text{ kg} \checkmark$ <i>maksimum massa van klip./maximum mass of stone.</i>	(3)
5.6.1	<i>Tipe 3 hefboom / Type 3 lever</i> ✓	(1)
5.6.2	$MV = \frac{Magsarm}{Lasarm} \checkmark$ $MV = \frac{0,35}{1,4} \checkmark = 0,25 \checkmark$	(3)
5.7.1	$Ep = mgh \checkmark$ $= 0,0085 \times 9,8 \times 30 \checkmark$ $= 2,499$ $\approx 2,5 \text{ J} \checkmark$	(3)
5.7.2	$Ek = \frac{1}{2}mv^2 \checkmark$ $= \frac{1}{2}(0,0085)(3,5)^2 \checkmark$ $= 0,05 \text{ J} \checkmark$	(3)
5.7.3	$EM = Ep + Ek \checkmark$ $= 2,5 + 0,05 \checkmark$ $= 2,55 \text{ J} \checkmark$	(3)
5.7.4	$EM(\text{top}) = EM(\text{below}) \checkmark$ $Ep + Ek = Ep + Ek$ $2,55 + 0,05 = 0,0085(9,8)(0) + \frac{1}{2}(0,0085)(v)^2 \checkmark$ $v = 24,73 \text{ m.s}^{-1} \checkmark$	(3)
		<b>[35]</b>

Penalize only once for rounding . done at this answer, only one mark/ *penaliseer slegs een punt by hierdie antwoord vir benadering.*



<b>QUESTION/VRAAG:6</b> (matter and materials / <i>materie en materiale</i> )		
6.1	<p><i>Termiese geleiding is wanneer hitte energie deur 'n medium oorgedra word na n ander medium</i> ✓. <i>Bv. Alluminium kookpot wat hitte gelei vanaf stoofplaat na voedsel in pot.</i> ✓</p> <p>Thermal conductivity is when heat energy transferred through one medium to another medium. ✓ Ex. Alluminium pot which conduct heat from stove plate to food in pot. ✓</p> <p><i>Elektriese geleiding is wanneer 'n materie elektriese stroom gelei in 'n stroombaan.</i> ✓ <i>Bv Koperkabel gelei elektrisiteit in 'n stroombaan.</i> ✓</p> <p>Electrical conductivity I when matter conduct electrical current in a circuit. ✓ Ex. Cuper cable conduct electricity in a circuit. ✓</p>	(4)



6.2	<i>'n Element is 'n suiwer stof wat uit een tipe atoom bestaan</i> ✓ <i>Bv Na / Mg./ens.</i> ✓ An element is a pure substance consisting of one type of atom. ✓ Exp.Na. / Mg./etc. ✓	(2)
6.3.1	Mg Magnesia / <i>Magnesium</i> ✓ Cr. Chromium / <i>Chroom.</i> ✓	(2)
6.3.2	Br <sup>-</sup> ✓	(1)
6.3.3	I. ✓	(1)
6.3.4	Ammonia / <i>Ammoniak</i>	(1)
6.3.5	K <sup>+</sup>	(1)
6.3.6	Sodium chloride, Calcium sulphate, Potassium nitrate, Sodium carbonate / <i>Natruimchloried, Kalsiumsulfaat, Kaliumnitraat, Natriumkarbonaat.</i>	(1)
	Any 2 salts ✓✓ / <i>Enige 2 soute</i> ✓✓	(2)
6.4.1	<i>element</i> ✓	(5)
6.4.2	<i>Mixture / mengsel</i> ✓	
6.4.3	<i>element</i> ✓	
6.4.4	compound / <i>verbinding</i> ✓	
6.4.5	compound / <i>verbinding</i> ✓	
6.5.1	$\text{Na}_2\text{CO}_3 + 2\text{HCl} \longrightarrow 2\text{NaCl} + \text{H}_2\text{O} + \text{CO}_2$	(4)
6.5.2	$3\text{H}_2 + \text{N}_2 \longrightarrow 2\text{NH}_3$	
		<b>[23]</b>
	<b>Total / Totaal</b>	<b>[150]</b>

