higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NASIENRIGLYN

NASIONALE SERTIFIKAAT

INGENIEURSWETENSKAP N1

26 JULIE 2018

Hierdie nasienriglyn bestaan uit 10 bladsye.

Kopiereg voorbehou

AFDELING A

VRAAG 1

1.1	1.1.1	B		
	1.1.2	C		
	1.1.3	C		
	1.1.4	A		
	1.1.5	B		
			(5 × 1)	(5)
1.2	1.2.1	Krag		
	1.2.2	Materie		
	1.2.3	Spesifieke hittekapasiteit		
	1.2.4	Wringkrag		
	1.2.5	Stolling		
			(5 × 1)	(5)
1.3	1.3.1	D		
	1.3.2	A		
	1.3.3	E		
	1.3.4	B		
	1.3.5	C		
			(5 × 1)	(5)
1.4	1.4.1	Waar		
	1.4.2	Onwaar		
	1.4.3	Waar		
	1.4.4	Onwaar		
	1.4.5	Waar		
			(5 × 1)	(5)
				[20]

TOTAAL AFDELING A: 20

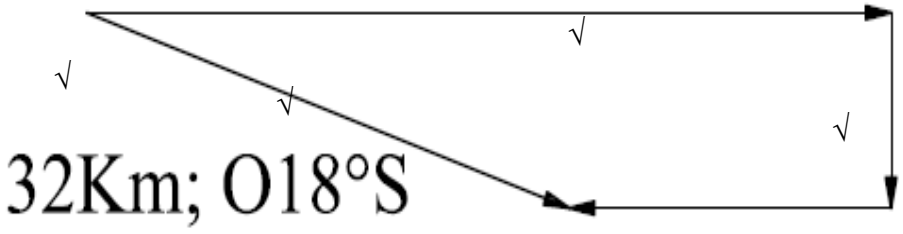
AFDELING B

VRAAG 2: DINAMIKA

2.1 2.1.1 $Dist. = 50 + 10 + 20$ ✓

$\underline{Dist. = 80km}$ (1)

2.1.2



(2)

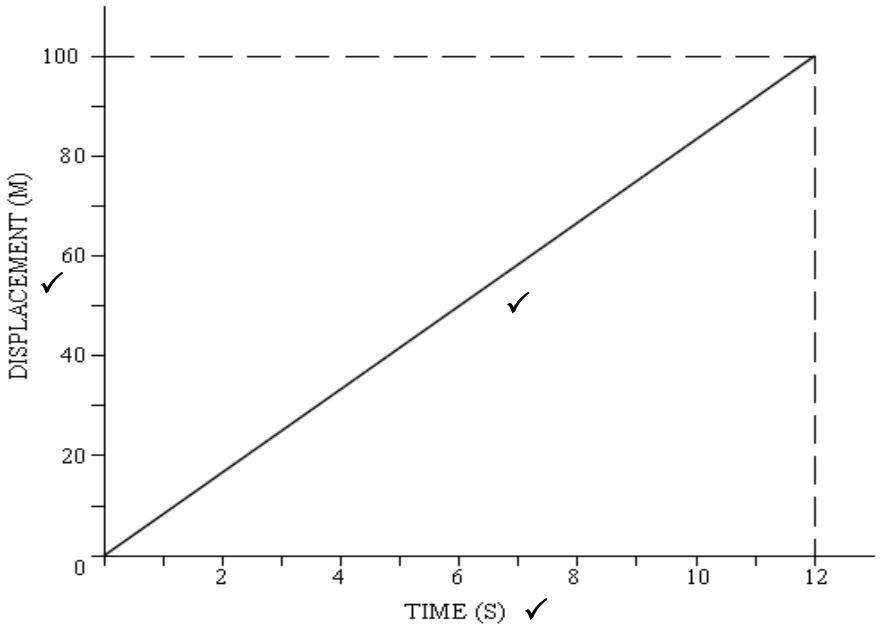
2.2 $v = \dfrac{45}{3,6}$

$\underline{v = 12,5m/s}$ ✓

$v_R = 12,5 - 1,3$

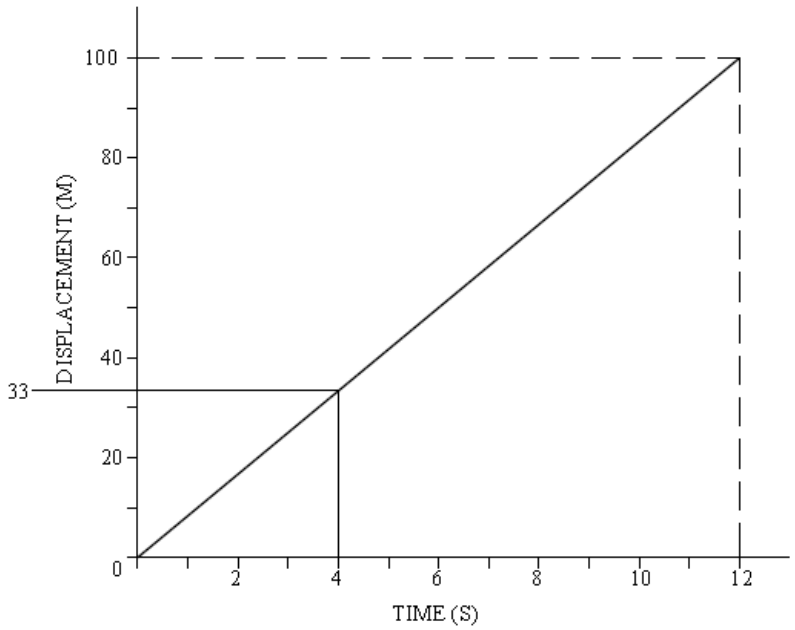
$v_R = 11.2m/s, East$ ✓ (2)

2.3 2.3.1



(3)

2.3.2

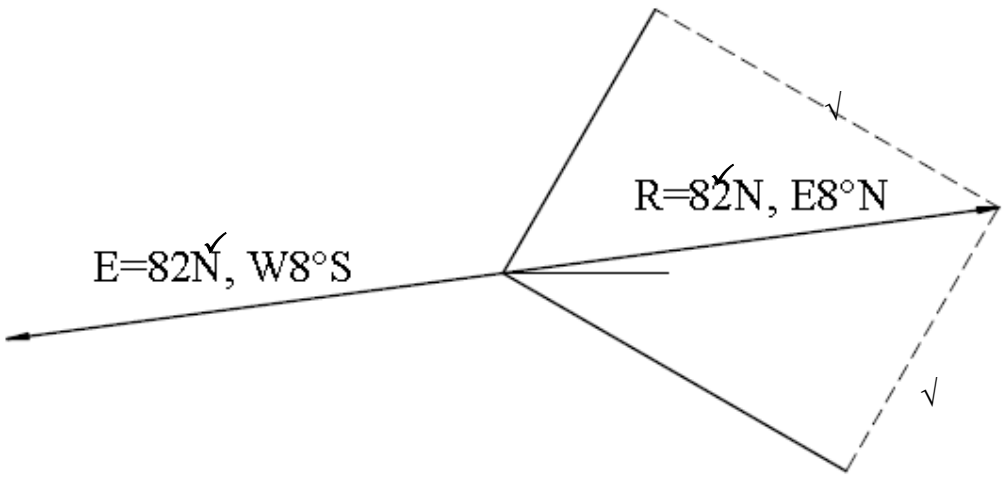


$s = 33m$ ✓ (1)

[9]

VRAAG 3: STATIKA

3.1



(3)

3.2 3.2.1

$$MA = \frac{load}{effort}$$

$$MA = \frac{350 \times 9{,}8}{550} \checkmark$$

$$\underline{\underline{MA = 6{,}236}} \checkmark$$

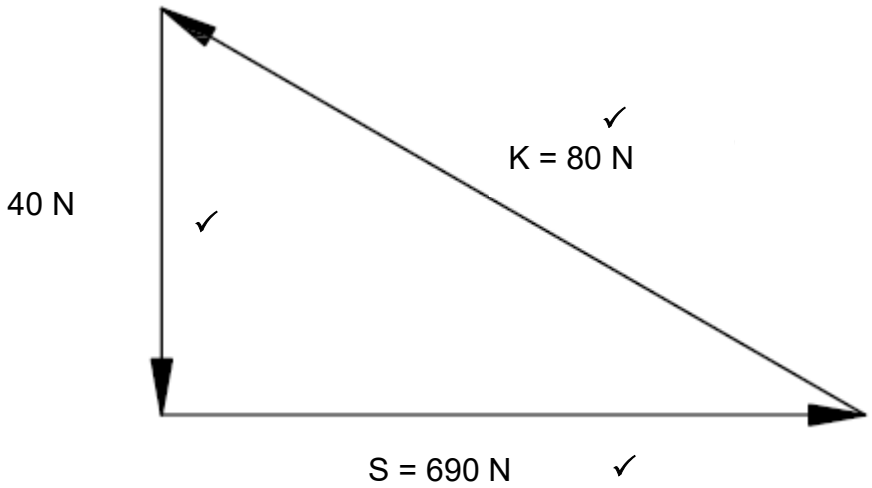
(2)

3.2.2 $$VR = \frac{D}{d}$$
$$VR = \frac{350}{250}$$
$$\underline{\underline{VR = 1{,}4}}\checkmark$$ (1)

3.3 $$r = \frac{300}{1000}$$
$$\underline{r = 0{,}3m}\checkmark$$

$$\mathrm{T} = F.r$$
$$\mathrm{T} = 850 \times 0{,}3\checkmark$$
$$\underline{\underline{\mathrm{T} = 255N.m}}\checkmark$$ (3)

3.4



(3)

3.5 $$LM = RM\checkmark$$
$$20 \times 3 = F \times 1\checkmark$$
$$\underline{\underline{F = 60N}}\checkmark$$ (3)

[15]

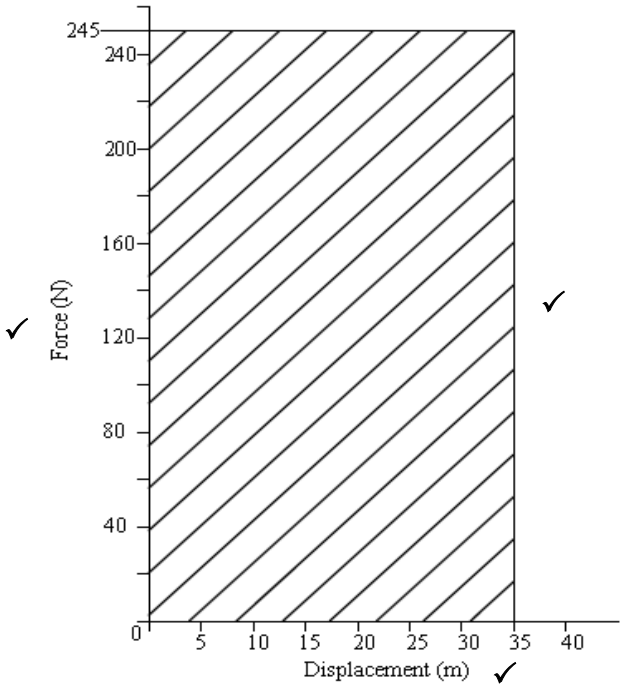
VRAAG 4: ENERGIEWERK EN KRAG

4.1 4.1.1

$$F = m \times 9{,}8$$
$$F = 25 \times 9{,}8$$
$$\underline{\underline{F = 245N}} \checkmark$$

(1)

4.1.2



(3)

4.1.3

$$A = l \times b$$
$$W = F.s$$
$$W = 245 \times 35$$
$$\underline{\underline{W = 8575\ J}}$$

(1)

4.2 4.2.1

$$v = \frac{115}{3{,}6}$$
$$\underline{\underline{v = 31{,}944\ m/s}}$$

(1)

4.2.2

$$P = F.v$$
$$P = 1200 \times 31{,}944$$
$$P = 38332{,}8\ W$$
$$\underline{\underline{P = 38{,}333\ kW}}$$

(1)

4.3 4.3.1 Kinetiese energie
4.3.2 Hitte-energie
4.3.3 Chemiese eneregie

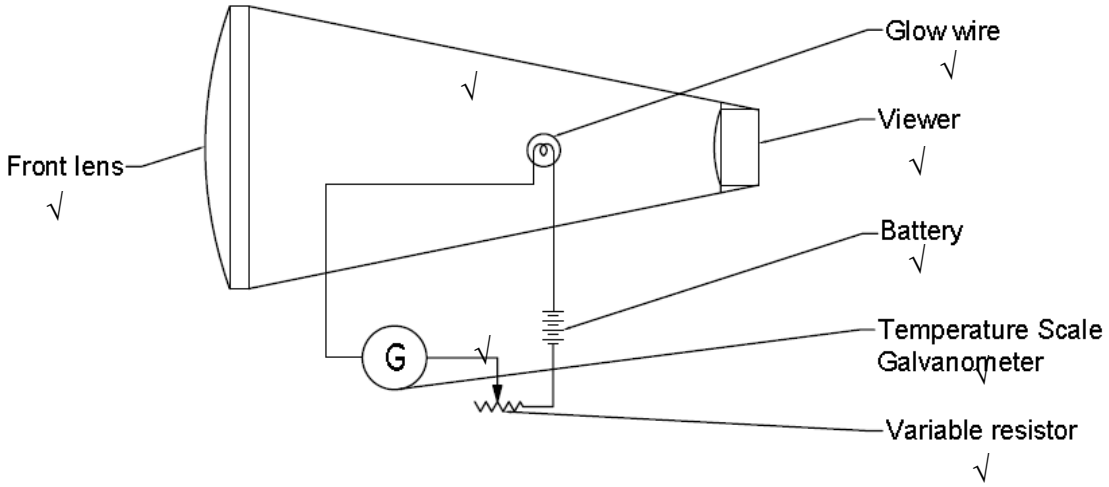
(3 × 1) (3)
[10]

VRAAG 5: HITTET

5.1 Temperatuur is die meting van die graad van hitte. ✓
Hitte is 'n vorm van energie.✓ (2)

5.2 5.2.1 Konduksie
5.2.2 Konveksie
5.2.3 Konveksie
5.2.4 Radiasie (uitstraling)
(4 × ½) (2)

5.3



(4)

5.4
- Verandering van dimensies
- Verandering in temperatuur
- Verandering in fase
- Verandering in komposisie
- Verandering in kleur
- Verandering in weerstand
- Konduksie van elektrisiteit (Enige 2 × 1) (2)

5.5 Elke materiaal het sy eie uitsettingstempo (1)

5.6 5.6.1 $Q = m.c\Delta t$

$$\Delta t = \frac{Q}{m.c}$$

$$\Delta t = \frac{60{,}5 \times 10^3}{3 \times 390}$$ ✓

$$\underline{\underline{\Delta t = 224{,}074\ °C}}$$ ✓

(224,074 moet lees 51,709) (2)

5.6.2 $\Delta t = t_f \quad t_o$

$t_f = \Delta t + t_o$

$t_f = 224{,}074 + 18$

$\underline{\underline{t_f = 242{,}074\ °C}}$ ✓

(vervang 224,074 met 51,709) (1)

5.7 5.7.1 $L_f = L_o + \Delta L$

$L_f = 4{,}6 + 0{,}00545$

$\underline{\underline{L_f = 4{,}60545\ m}}$ ✓ (1)

5.7.2 $\Delta t = t_f \quad t_o$

$\Delta t = 85 \quad 13$

$\underline{\underline{\Delta t = 72\ °C}}$ ✓ (1)

[16]

VRAAG 6: PARTIKELSTRUKTUUR VAN MATERIE

6.1 Byvoeging van hitte en die wegneem van hitte ✓ (1)

6.2 Vaste stof: ys, klip, hout, ens.
Vloeistof: water, olie, petrol, ens.
Gas: stoom, waterstof, suurstof, ens. (3)

6.3 6.3.1 Smelt
6.3.2 Kondensasie
6.3.3 Stolling
(3 × 1) (3)

6.4 6.4.1 Elektron√
6.4.2 Proton√
6.4.3 Kern√
6.4.4 Neutron√
(4 × ½) (2)

[9]

VRAAG 7: ELEKTRISITEIT

7.1
- Lengte van die geleier
- Dwarsdeursnee area
- Tipe geleier
- Temperatuur van geleier (Enige 1 × 1) (1)

7.2
$$I = \frac{V}{R}$$
$$I = \frac{220}{26} \checkmark$$
$$\underline{\underline{I = 8{,}462\ A}} \checkmark$$
(2)

7.3 7.3.1
$$\frac{1}{R_t} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$$
$$\frac{1}{R_t} = \frac{1}{7} + \frac{1}{9} + \frac{1}{15} \checkmark$$
$$\underline{\underline{R_t = 3{,}119\ \Omega}} \checkmark$$
(2)

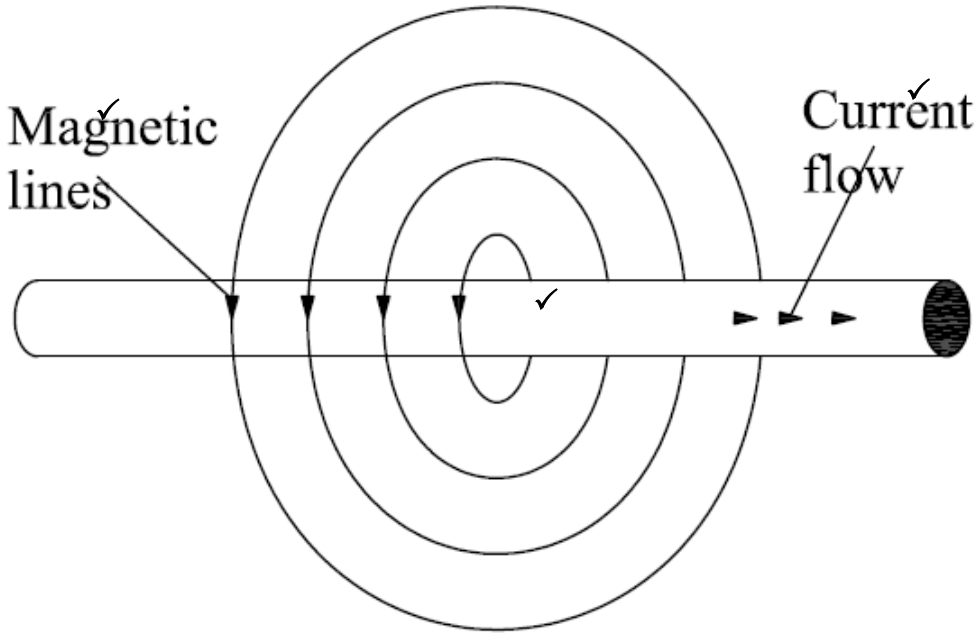
7.3.2
$$I = \frac{V}{R}$$
$$I = \frac{12}{3{,}119} \checkmark$$
$$\underline{\underline{I = 3{,}847\ A}} \checkmark$$
(2)

7.4 Meer draaie
Gebruik ‘n kern
Hoër stroom (Enige 1 × 1) (1)

7.5
$$Q = I^2.R.t$$
$$t = \frac{Q}{I^2.R}$$
$$t = \frac{1579 \times 10^3}{22{,}6^2 \times 125} \checkmark$$
$$\underline{\underline{t = 24{,}732 s}} \checkmark$$
(2)

7.6
$$V = \frac{P}{I}$$
$$V = \frac{120}{8} \checkmark$$
$$\underline{\underline{V = 15V}} \checkmark$$
(2)

7.7



(3)

7.8
- Relê
- Deurklokkie
- Elektriese motors
- Luidsprekers (Enige 1 × 1) (1)

7.9 7.9.1 Weerstand sal toeneem. (1)
7.9.2 Weerstand sal afneem. (1)

7.10 Wanneer die skakelaar van die klokkie gesluit is, sal die stroom deur die solenoïed vloei en die weekstaalkern sal gemagnetiseer word.✓ Die ysterkern sal die ysterstaaf wat aan die slanertjie gekoppel is, aantrek.✓ Die slanertjie sal teen die ghong slaan. Wanneer die skakelaar laat los word, sal die slanertjie na sy oorspronklike posisie terugkeer.✓ (3)

[21]

TOTAAL AFDELING B: 80
GROOTTOTAAL: 100

Kopiereg voorbehou