education

Department of Education
FREE STATE PROVINCE

GRADE 11/*GRAAD 11*

PROVINCIAL FORMAL ASSESSMENT TASK / *PROVINSIALE FORMELE ASSESSERINGSTAAK*

MARCH 2015/M*AART 2015*

MEMORANDUM

PHYSICAL SCIENCES/*FISIESE WETENSKAPPE*
CONTROL TEST/*KONTROLETOETS*

TIME: 2 HOURS / *TYD: 2 UUR*

MARKS: 100 / *PUNTE: 100*

This memorandum consists of 6 pages.
***Hierdie memorandum bestaan uit 6 bladsye*.**

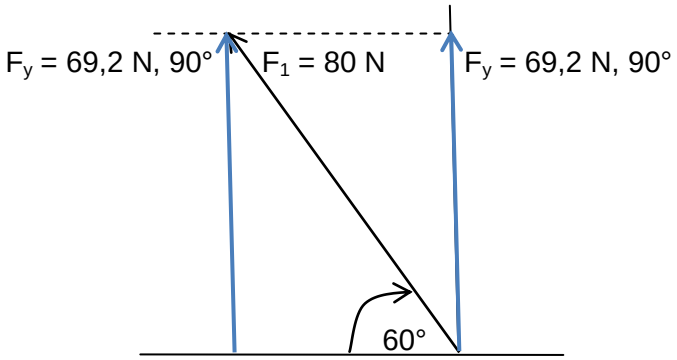
QUESTION 1/*VRAAG 1*

1.1 C ✓✓ (2)
1.2 C ✓✓ (2)
1.3 A ✓✓ (2)
1.4 C ✓✓ (2)
1.5 D ✓✓ (2)
1.6 B ✓✓ (2)
1.7 B ✓✓ (2)
1.8 D ✓✓ (2)
1.9 C ✓✓ (2)
1.10 B ✓✓ (2)
[10 x 2 = 20]

QUESTION 2/*VRAAG 2*

2.1. The vector with same effect ✓ as all the vectors together. ✓
Die vektor met dieselfde uitwerking as al die vektore saam. (2)

2.2 2.2 Scale/*Skaal* 10 mm:10 N Up/*Op* +



Direction of F_1 60° above x-axis / *Rigting van F_1 60° bo x-as*	✓
Length of F_1 80 mm / *Lengte van F_1 80 mm*	✓
Lines prependicular to the x- or y-axis from arrowhead of F_1 / *Lyne loodreg op die x- or y-as vanaf die pylpunt van F_1*	✓
Length of F_y between/ *Lengte van F_y tussen* 66 mm < F_y < 72 mm	✓
F_y between/ *F_y tussen* 66 N, 90° < F_y < 72 N, 90°	✓

(5)

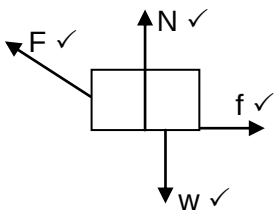
2.3.1 To the right as positive:/*Na regs is positief:*
F_{xNET} = F_{1x} + F_{2x}
= F_1 x cos 60°+ F_{2x}
= - 80 x 0,5 ✓ + 40 ✓
= - 40 + 40
= 0 ✓ (3)

2.3.2 **POSITIVE MARKING FROM QUESTION 2.2/*POSITIEWE NASIEN VAN VRAAG 2.2***
w = F_{1y} + F_{2y}
w = 69,2 + (42) ✓
∴ w = 111,2 N; downwards / *afwaarts* ✓ (2)
[12]

QUESTION 3/VRAAG 3

3.1 The force that the surface exerts on the object, ✓ perpendicular to the surface.✓
Dit is die krag wat die oppervlak op die voorwerp uitoefen loodreg op die oppervlak. (2)

3.2



Accepted labels/*Aanvaarde byskrifte:*	
w	F_g / F_w /force of Earth on object/weight/980 N/mg / gravitational force *F_g / F_w /krag van Aarde op voorwerp/gewig/ 980 N/mg/gravitasiekrag*
N	F_N/normal/*F_N /normaal*
f	Frictional force/F_f/f_k *Wrywingskrag*
F	F_A/Applied force/*Toegepaste krag*

(4)

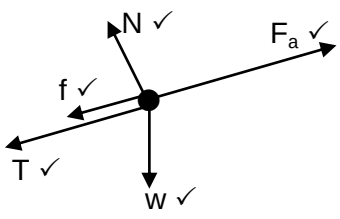
3.3.1 Consider forces and components in vertical plane.
Oorweeg kragte en komponente in vertikale vlak.
Upward positive:/*Opwaarts positief:*
F_{net} = ma ✓
N +F_y + w = ma
N + 50 x sin 30° - 10 x 9,8 = 0 ✓
∴ N = 73 N ✓ (3)

3.2.2 To the left as positive:/*Na links as positief:*
F_{net} = ma ✓
F_x + f = ma
Fcos30° + f ✓= 10 x 1,5 ✓
43,3 + f = 10 x 1,5
f = -28,3 N ✓
∴ f = 28,3 N to the right / *na regs* ✓ (5)

3.3.3 **POSITIVE MARKING FROM QUESTION 3.3.1 AND 3.3.2.**
POSITIEWE NASIEN VAN VRAAG 3.3.1 EN 3.3.2.
$f_k = \mu_k N$ ✓
28,3 ✓= μ_k(73) ✓
∴ μ_k = 0,39 ✓ (4)
[18]

QUESTION 4/*VRAAG 4*

4.1



Accepted labels/*Aanvaarde byskrifte:*	
w	F_g / F_w/force of Earth on object/weight/ 8820 N/mg/gravitational force *F_g/F_w/krag van Aarde op voorwerp/gewig/ 8 820 N/mg/gravitasiekrag*
N	F_N/normal/*normaal*
f	Frictional force/F_f /f_k/*Wrywingskrag*
T	F_T/Tension in rope/*Spanning in die tou*
F	F_a/Applied force/*Toegepaste krag*

(5)

4.2 **OPTION 1:/OPSIE 1**

Car: To the right as positive: / *Motor: Na regs as positief:*
F_{net} = ma ✓
F_A + f + T + $w_{//}$ = ma
F_A + f + (-T) + (- mgsin30°) = ma
7 920 + (-1 800) + T ✓+ (- 900 x 9,8 sin30°)✓ = 900 x 3 ✓
T = - 990 N
∴ T = 990 N ✓

OPTION 2:/OPSIE 2

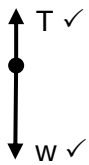
Trailer: To the right as positive./*Sleepwa: Na regs as positief.*
F_{net} = ma ✓
T + f + (- mgsin30°)= ma
T – 200 ✓+ (- 100 x 9,8 sin30°) ✓= 100 x 3 ✓
T = 990 N ✓ (5)

4.3 Newton's First Law (of motion)/*Newton se Eerste (Bewegings)wet* ✓ (1)
[11]

QUESTION 5/*VRAAG 5*

5.1 When a resultant (or net) force acts on an object, ✓ the object will accelerate in the direction of the force at an acceleration directly proportional to the force ✓ and inversely proportional to the mass of the object. ✓
Wanneer 'n resulterende (of netto) krag op 'n voorwerp inwerk, versnel die voorwerp in die rigting van die krag teen 'n versnelling direk eweredig aan die krag en omgekeerd eweredig aan die massa van die voorwerp. (3)

5.2



Accepted labels/*Aanvaarde byskrifte:*	
w	F_g / F_w/force of Earth on object/weight/58,8 N/mg/gravitational force *F_g/F_w/krag van Aarde op voorwerp/gewig/*58,8 *N/mg/gravitasiekrag*
T	F_T/Tension in rope/*Spanning in die tou*

(2)

5.3.1 3 kg mass: Take to the right as positive/*3 kg mass: Neem regs as positief:*
F_{net} = ma ✓
T + f = ma
T + μmg = ma
T - 0,34 x 3 x 9,8✓ = 3a ✓
T - 10 = 3a ✓ (4)

5.3.2 6 kg mass: Downwards as positive./*6 kg massa: Afwaarts as positief.*
F_{net} = ma
F_g -T = ma
6 x 9,8 - T ✓= 6a ✓
58,8 –T = 6a ✓ (3)

5.4

OPTION 2/*OPSIE 2*	**OPTION 2/*OPSIE 2***
T – 10 = 3a (from / van Q5.3.1) ∴ a = $\frac{T-10}{3}$ ✓ 58,8 –T = 6a (from Q5.3.2) ∴ 58,8 –T = 6($\frac{T-10}{3}$) ✓ ∴ T = 26,27 N ✓	Use simultaneous equations/ *Gebruik gelyktydige vergelykings:* T – 10 = 3a x 2 ✓ -T + 58,8 = 6a 3T – 78,8 = 0 ✓ ∴ T = 26,27 N ✓

(3)

[15]

QUESTION 6/VRAAG 6

6.1 Every body in the universe attracts every other body with a force that is ✓
directly proportional to the product of their masses and ✓
inversely proportional to the square of the distance between their centres. ✓
Elke liggaam in die heelal trek elke ander liggaam aan met 'n krag wat
direk eweredig is aan die produk van hulle massas en
omgekeerd eweredig is aan die kwadraat van die afstand tussen hulle middelpunte. (3)

6.2 $g = \frac{Gm}{r^2}$ ✓

$g = \frac{6,67 \times 10^{-11} \times 6,42 \times 10^{23}}{(3,4 \times 10^{6})^2}$ ✓ ✓

$= 3,7 \text{ m} \cdot \text{s}^{-2}$ ✓ (4)

[7]

QUESTION 7/*VRAAG 7*

7.1 A chemical bond formed between atoms ✓ by the sharing of electrons. ✓
'n Chemiese binding wat gevorm word tussen atome deur die deling van elektrone. (2)

7.2
7.2.1 6 ✓ (1)

7.2.2 5 ✓ (1)

7.3
7.3.1 Covalent/*Kovalent* ✓ (1)

7.3.2 4 ✓ (1)

7.3.3 2 ✓ (1)

7.3.4 Angular/*Hoekig* ✓ (1)

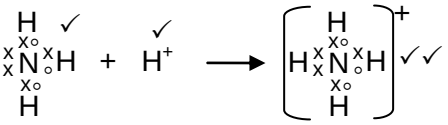
7.4
7.4.1 4 ✓ (1)

7.4.2 3 ✓ (1)

7.4.3 Trigonal pyramidal/*trigonaal piramidaal* ✓ (1)

7.5

7.5.1 Dative covalent bond/*Datiefkovalente binding* ✓ (1)

7.5.2  (4)

7.5.3 Tetrahedral/*Tetraëdries* ✓ (1)
[17]

GRAND TOTAL/*GROOTTOTAAL*: 100