Downloaded from SEE academy: www.seeacademy.co.za

LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA
DEPARTMENT OF
EDUCATION
VHEMBE EAST DISTRICT

VHEMBE EAST DISTRICT

NATIONAL
SENIOR CERTIFICATE

GRADE 11

PHYSICAL SCIENCES
CONTROLLED TEST 1 MEMORANDUM
07 MARCH 2022

MARKS: 35

SEE ACADEMY

This Memorandum consists of 8 pages including the cover page.

Downloaded from SEE academy: www.seeacademy.co.za

QUESTION 1

1.1 B ✓✓ **(2)**

1.2 B ✓✓ **(2)**

1.3 B ✓✓ **(2)**

1.4 C ✓✓ **(2)**

1.5 C ✓✓ **(2)**

1.6 D ✓✓ **(2)**

1.7 A✓✓ **(2)**

1.8 C✓✓ **(2)**

[12]

QUESTION 2

2.1 The vector with the same effect✓ as all the vectors together ✓ (2)

2.2 F_{PX} = F_P . cosθ

= 250 x cos 10^0 ✓

= 246,20 N ✓

F_{PY} = F_P . sin θ

= 250. Sin 10^o ✓

= 43.41 N ✓ (4)

2.3 F_{QX} = F cos θ

= 150 cos 35^o

= 122,87 N to the right ✓

F_{RX} = F_{PX} + F_{QX}

= -246 + 122.87 ✓

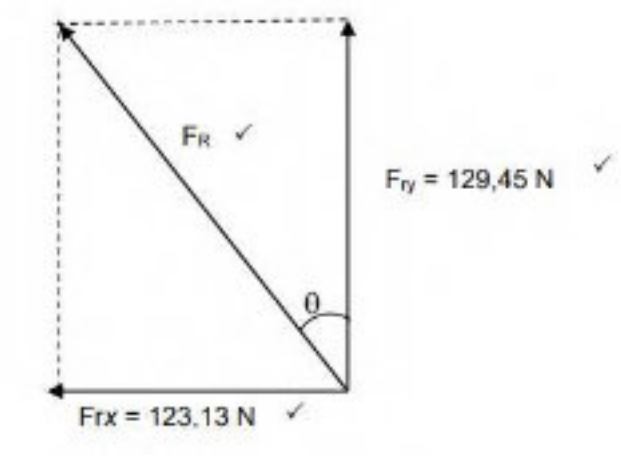
= 123.13 N

= 123,13 N to the left

SEE ACADEMY

Downloaded from SEE academy: www.seeacademy.co.za

2.4



(3)

2.5 $F_R^2 = F_{RX}^2 * F_{RY}^2$ ✓

$= (122.13)^2 + (129,49)^2$ ✓

$= 31918,30$

$F_R = 178,66$ N ✓ (3)

2.6 $\tan \theta = \frac{F_{RX}}{F_{RY}}$

$= \frac{123,13}{129,45}$ ✓

$= 0.$

$\theta = 43.57^o$ ✓

Direction = 360° - 43,57° = 316,43° ✓ (3)

2.7 0° ✓ (1)

[19]

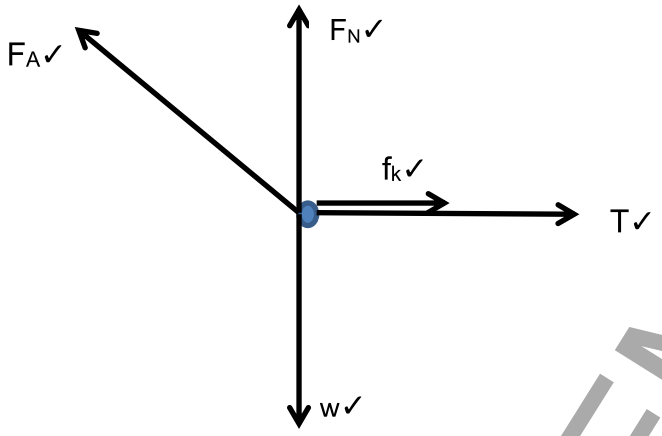
SEE ACADEMY

Downloaded from SEE academy: www.seeacademy.co.za

QUESTION 3

3.1 It is the force that opposes the motion of an object✓ and which acts parallel to the surface. ✓ (2)

3.2



(5)

3,3 3.3.1 $\tan 20^0 = \frac{F_V}{F_H}$

$F_V = 38 \tan 20^0$ ✓

= 13,83 N✓ (2)

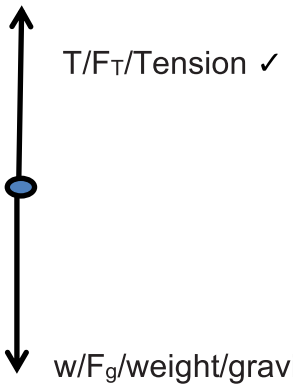
3.3.2 $F_N = F_g - F_V$ (3)

= (5)(9.8) ✓ - 13.83✓

= 35.17 N✓

3.4 When a resultant force act s 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. ✓ (2)

3.5



SEE ACADEMY

Downloaded from SEE academy: www.seeacademy.co.za

OPTION 1

Left/Upwards as positive

5 kg block: F_{net} = ma ✓

-T + FH – f = ma

-T + 38 – (0.2)(35.17) ✓ = 5a ✓----------(1)

3 kg block : -Fg + T = ma

-(3)(9.8) + T = 3a ✓ ----------(2)

Substitute 2 into 1

A = 0.196m.s^{-2}

Substitute a into 2:

-29.4 + T = (3)(0.196) ✓

T = 29.99N ✓ (5)

OPTION 2

Right/ Downwards as positive

5 kg block: F_{net} = ma✓

T - FH + f = ma

T - 38 + (0.2)(35.17) ✓ = -5a✓ ----------(1)

3 kg block : Fg - T = ma

(3)(9.8) - T = -3a✓ ----------(2)

Substitute 2 into 1

a = 0.196m.s^{-2}

Substitute a into 2:

29.4 - T = -(3)(0.196) ✓

T = 29.99N✓ (5)

SEE ACADEMY

Copyright reserved

Downloaded from SEE academy: www.seeacademy.co.za

QUESTION 4

4.1

Criteria for hypothesis	
The dependent and independent variables are stated correctly	✓
State the relationship between the dependent and independent variables	✓
Dependent variable : acceleration Independent variable: (net) force	

Example :

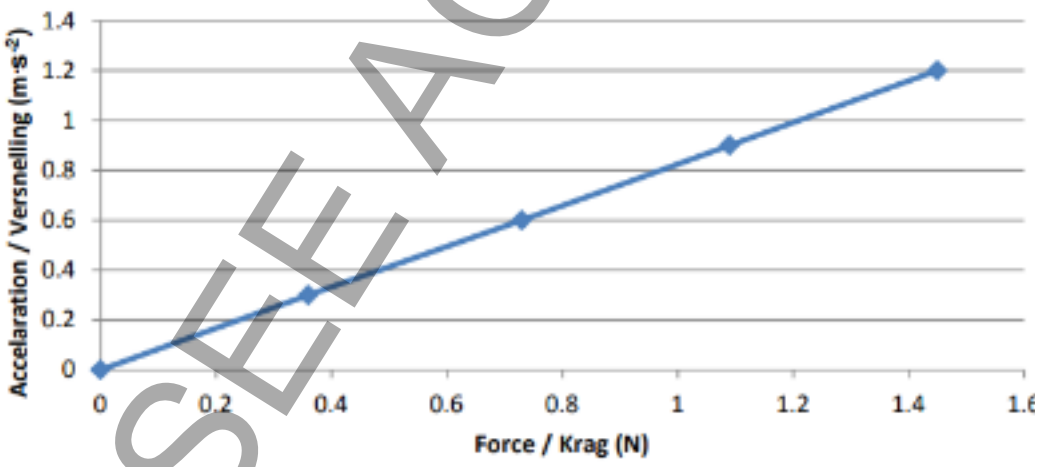
The (net) force is directly proportional to acceleration if the mass of the trolley is kept constant ✓✓ (2)

4.2 4.2.1 (Net) Force ✓ (1)

4.2.2 Mass of the trolley✓ (1)

4.3

Graph of acceleration versus net force.



Marking criteria for the graph

Axis with correct / appropriate scale	✓
3 or more coordinates correctely plotted	✓✓
Drawing a line of best fit	✓

(4)

SEE ACADEMY

Downloaded from SEE academy: www.seeacademy.co.za

4.4 Accept any set of coordinates from the graph

gradient $= \frac{1.45 - 0.36\checkmark}{1{,}2 - 0.3\ \checkmark} = 1.21\ \checkmark$ (3)

4.5 Positive marking from question 4.4

gradient $= \frac{a}{F} = \frac{1}{m}$

m $= \frac{1}{1.21}\checkmark = 0.83\ kg\checkmark$ (2)

[13]

QUESTION 5		
5.1	Every body /particles 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. ✓✓	(2)
5.2	Weightlessness is the sensation experienced when all contact forces are removed.✓✓	(2)
5.3	$F = G\frac{M1M2}{r^2}\checkmark$ $= 6.67\ X\ 10^{-11}\frac{(5.98\ X10^{24})(3800)}{((6.38\ X\ 10^{6}+(25\ X\ 10^{6}))^2}\checkmark$ = 1539.23 N✓✓	(4)
5.4	Greater than,✓	(1)
5.5.	The mass is greater✓ and for the same force ✓the distance must also be greater. ✓ (because the product of the masses is directly proportional to the square of the distance between the centres.)	(3)
		[12]

SEE ACADEMY

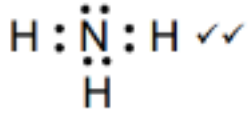
Downloaded from SEE academy: www.seeacademy.co.za

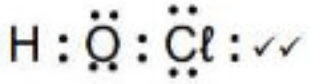
QUESTION 6

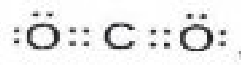
6.1. Marking guidelines:

If any of the underlined keywords/phrases are ommitted minus 1 mark.(2) ✓

Two electrons shared between two atoms in a covalent bond ✓✓ (2)

6.1.2 (a)  ✓✓ (2)

(b)  ✓✓ (2)

(c)  ✓✓ (2)

6.1.3 (a) 3 ✓ (1)

(b) 2 ✓ (1)

(c) Trigonal pyramid ✓ (1)

6.1.4 O – H ✓

O – H ΔEN = 3,5 – 2-1 = 1.4

N – H ΔEN = 3 - 2,1 = 0,9 ✓ (2)

6.2.1 The average distance between the nuclei of two bonding atoms ✓✓ (2)

6.2.2 125 pm ✓ (1)

6,2,3 A measure of the bond strength of a chemical bond, ✓✓ (2)

6.2.4 Less than ✓ (1)

6.2.5 The shorter the bond length, ✓ the greater the bond erhergy✓ (2)

[23]

TOTAL = 100 marks

SEE ACADEMY