



education

Department: Education

GAUTENG PROVINCE

**MAMELODI EAST CLUSTER
CONTROL TEST 1 2016**

GRADE 11

PHYSICAL SCIENCES

MARKING MEMORANDUM

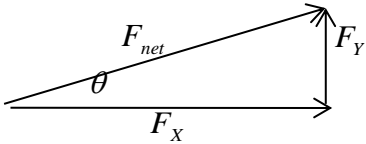
Please read the marking guidelines on pages 33 – 37 of the Physical Sciences Examination Guidelines, Senior Certificate, Grade 12, 2015.

QUESTION 1

1.1	B ✓✓	(2)	
1.2	C ✓✓	(2)	
1.3	C ✓✓	(2)	
1.4	D ✓✓	(2)	
		[8]	

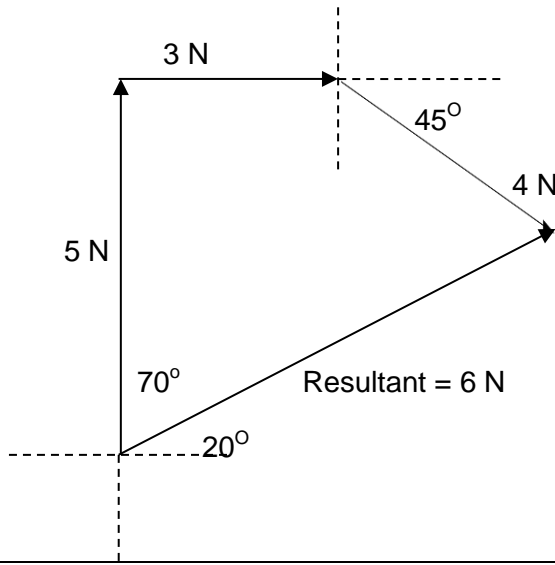
QUESTION 2

2.1	They have both magnitude and direction. ✓✓	(2)	
-----	--	-----	--

2.2	$F_x = Q + R \cos 45^\circ$ $= 3 + 4 \cos 45^\circ \checkmark$ $= 5,828 \text{ N, right}$ $F_y = P - R \sin 45^\circ$ $= 5 - 4 \sin 45^\circ \checkmark$ $= 2,172 \text{ N, up}$  $F_{net} = \sqrt{F_x^2 + F_y^2}$ $= \sqrt{5,828^2 + 2,172^2} \checkmark$ $= 6,22 \text{ N}$ $\tan \theta = \frac{F_y}{F_x}$ $\tan \theta = \frac{2,172}{5,828} \quad \checkmark \checkmark$ $\theta = 20,44^\circ$ Resultant force = 6,22 N ✓ in direction: 20,44° ✓ OR Bearing 69,56°, N69,56°E or 20,44° North of East	(7)	
-----	--	-----	--

2.2

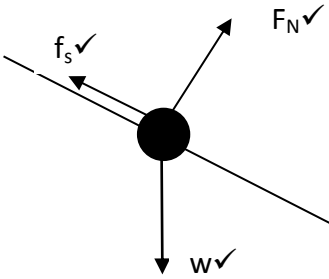
SCALE DRAWING:



CRITERIA	MARK
Each angle correctly measured	1 × 2
Correct tail to head drawing of PQR	1 × 3
Resultant both magnitude and direction correct starting from origin to head of vector R	1 × 2
TOTAL	7 MARKS

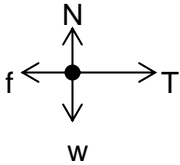

2.3	The resultant of all forces ✓ acting at point S is zero ✓	(2)	
2.4	<ul style="list-style-type: none"> • Correct shape of triangle ✓ • Forces labelled and point correct directions ✓ • Labelled angles are all correct ✓ 	(3)	
2.5	$\sin 35^\circ = \frac{w}{T}$ $\sin 35^\circ = \frac{60}{T} \checkmark$ $T = 104,61 \text{ N} \checkmark$ $\tan 35^\circ = \frac{w}{F}$ $\tan 35^\circ = \frac{60}{F} \checkmark$ $F = 85,69 \text{ N} \checkmark$	(4)	ACCEPT: Sine rule, cosine rule, component method and any other trigonometric method
		[18]	

QUESTION 3

3.1	The force that <u>opposes the motion of an object</u> ✓ and which <u>acts parallel to the surface.</u> ✓	(2)	
3.2		(3)	Other labels to be accepted: Normal/ N Friction/ f Weight/ gravity/ F _g
3.3	<p>3.3.1</p> $f_s = mg \sin \theta \checkmark$ $= 95,0 \times 9,8 \times \sin 23,2^\circ \checkmark$ $= 366,76 \text{ N} \checkmark$	(3)	
	<p>3.3.2</p> $N = mg \cos \theta \checkmark$ $N = 95,0 \times 9,8 \times \cos 23,2^\circ \checkmark$ $N = 855,72 \text{ N}$ $f_s = \mu_s N \checkmark$ $366,76 = \mu_s \times 855,72 \checkmark$ $\mu_s = 0,43 \checkmark$	(5)	
3.4	Less than ✓	(1)	
		[14]	

QUESTION 4

4.1	When a <u>resultant (net) force</u> acts on an object, the object will accelerate in the direction of the force. This <u>acceleration is directly proportional to the force</u> ✓ and <u>inversely proportional to the mass of the object.</u> ✓	(2)	
4.2	Force of the block on the table ✓ and the force of the table on the block. ✓ OR Force of the block on the string ✓ and the force of the string on the block. ✓	(2)	

4.3	<p>4.3.1 6 kg:</p>  $F_{net} = ma \checkmark$ $T + (-f) = ma$ $T - 11.76 = 6a \checkmark \dots \dots \dots (1)$ <p>2 kg:</p>  $F_{net} = ma$ $w + F + (-T) = ma$ $(2 \times 9.8) + 2 - T = 2a \checkmark$ $21.6 - T = 2a \dots \dots \dots (2)$ $(1) + (2): 9.84 = 8a \checkmark$ $a = 1.23 \text{ m} \cdot \text{s}^{-2} \checkmark$		
	<p>4.3.2 $T - 11.76 = 6(1.23) \checkmark$ $T = 19.14 \text{ N} \checkmark$</p>	(5)	
4.4	Increases \checkmark	(1)	
4.5	$F = G \frac{m_1 m_2}{d^2} \checkmark$ $= \frac{(6.67 \times 10^{-11})(6.5 \times 10^{20})(90)}{(5.5 \times 10^5)^2} \checkmark \checkmark$ $= 12.90 \text{ N} \checkmark$ <p>OR</p> $g = G \frac{m_1}{d^2} \checkmark$ $= \frac{(6.67 \times 10^{-11})(6.5 \times 10^{20})}{(5.5 \times 10^5)^2} \checkmark$ $= 0.143 \text{ m} \cdot \text{s}^{-2}$ $w = mg$ $= 90 \times 0.143 \checkmark$ $= 12.89 \text{ N} \checkmark$	(4)	
		[16]	

QUESTION 5

5.1	B ✓✓		
5.2	A ✓✓		
		[4]	

QUESTION 6

6.1	Molecule	Lewis structure	Shape of the molecule	Polarity of the bonds	Polarity of the molecule	
	CO ₂ (g)	$\begin{array}{c} \cdot\cdot \\ \cdot\cdot \\ \text{O}::\text{C}::\text{O} \\ \cdot\cdot \\ \cdot\cdot \end{array}$ ✓✓	Linear ✓	Polar ✓	Non polar ✓	(10)
	H ₂ O (g)	$\begin{array}{c} \text{H} \quad \text{H} \\ \cdot\cdot \\ \cdot\cdot \\ \text{O} \\ \cdot\cdot \\ \cdot\cdot \end{array}$ ✓✓	Angular/bent ✓	Polar ✓	Polar ✓	
6.2.1	Dative covalent bond ✓					(1)
6.2.2	$\begin{array}{c} \text{H} \\ \cdot\cdot \\ \cdot\cdot \\ \text{H} \end{array} \text{N} \begin{array}{c} \cdot\cdot \\ \cdot\cdot \\ \cdot\cdot \\ \cdot\cdot \end{array} + \text{H}^+ \longrightarrow \left[\begin{array}{c} \text{H} \\ \cdot\cdot \\ \cdot\cdot \\ \text{H} \end{array} \text{N} \begin{array}{c} \cdot\cdot \\ \cdot\cdot \\ \cdot\cdot \\ \cdot\cdot \end{array} \text{H} \right]^+$ ✓✓					(4)
						[15]