Education and Sport Development

Department of Education and Sport Development
Departement van Onderwys en Sportontwikkeling
Lefapha la Thuto le Tlhabololo ya Metshameko
NORTH WEST PROVINCE

PROVINCIAL ASSESSMENT

GRADE 11

TECHNICAL SCIENCES
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MEMORANDUM

MARKS: 150

This memorandum consists of 9 pages.

Demo
NW/JUNE/TEC-SCNE/ EMIS/6*******

QUESTION 1

1.1. B ✓✓
1.2. B ✓✓
1.3. B ✓✓
1.4. D ✓✓
1.5. B ✓✓
1.6. A ✓✓
1.7. A ✓✓
1.8. C ✓✓

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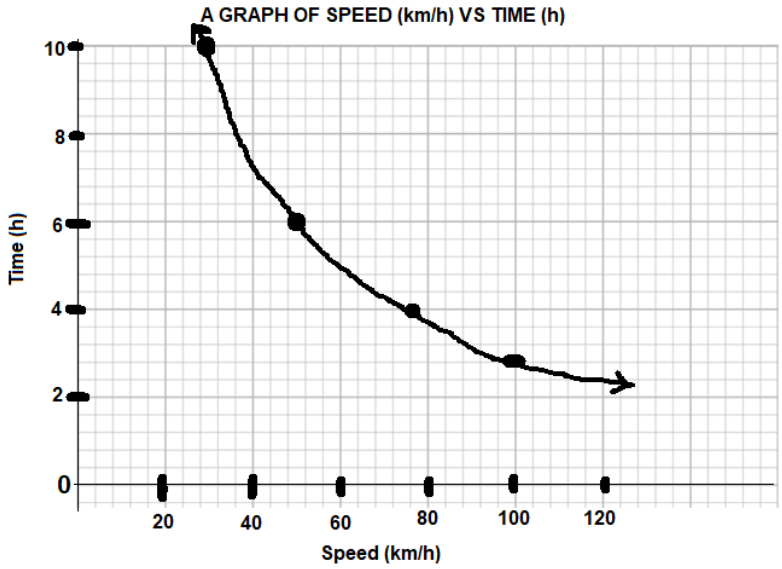
QUESTION 2

2.1		
		**Marking:** Heading ✓ x axis labelled ✓ y axis labelled ✓ 4 points plotted ✓✓ Shape ✓ (6)
2.2.	Inverse proportion ✓ One variable increases as the other on decrease ✓✓	(3)

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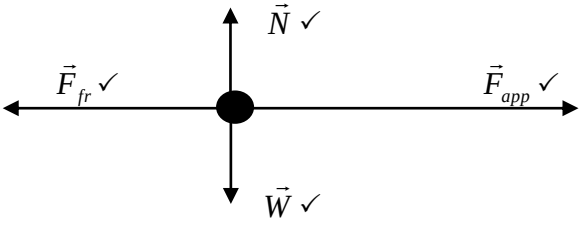
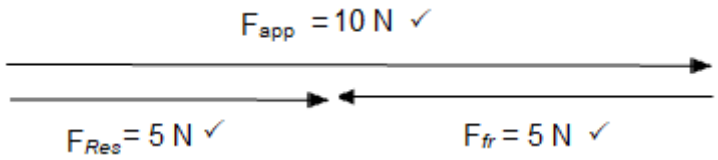
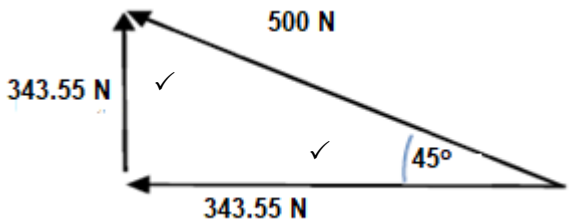
QUESTION 3

3.1	A single vector that has the same effect as all the other vectors acting on an object ✓✓ (2)
3.2.1	 (4)
3.2.2	$\vec{F}_R = \vec{F}_1 + \vec{F}_2$ ✓ $\vec{F}_R = 10 + (-5)$ ✓ $\vec{F}_R = 5N$ to the Right ✓ (3)
3.2.3	 (3)
3.3	$\vec{F}_R^2 = \vec{F}_1^2 + \vec{F}_2^2$ ✓ 8^2 ✓ $= 6^2 + y^2$ ✓ $y = 5.29\,\text{m}$ Therefore the wall is 5.29 m high ✓ (4)
3.4.1	$\vec{f}_x = \vec{F}\cos\theta$ ✓ $\vec{f}_x = 500\cos 45^o$ ✓ $\vec{f}_x = 343.55N$ ✓ (3)
3.4.2	$\vec{f}_y = \vec{F}\sin\theta$ ✓ $\vec{f}_y = 500\sin 45^o$ ✓ $\vec{f}_y = 343.55N$ ✓ (3)
3.4.3.	 ✓ ✓ ✓ (3)

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QUESTION 4

4.1.1	$\vec{f}_{Ax} = \vec{F}_A \cos\theta$ ✓ $\vec{f}_{Ax} = 500\cos 50^o$ ✓ $\vec{f}_{Ax} = 321.39N$ Left ✓	$\vec{f}_{Bx} = \vec{F}_B \cos\theta$ $\vec{f}_{Bx} = 400\cos 60^O$ ✓ $\vec{f}_{Bx} = 200N$ right✓ (5)
4.1.2	$\vec{f}_{Ay} = \vec{F}_A \sin\theta$ ✓ $\vec{f}_{Ay} = 500\sin 50^o$ ✓ $\vec{f}_{1y} = 306.42$ Upward✓	$\vec{f}_{By} = \vec{F}_2 \sin\theta$ $\vec{f}_{By} = 400\sin 60^o$ ✓ $\vec{f}_{By} = 346.41N$ upward ✓ (5)
4.2	RESULTANT	
	$F_{X(RES)}$ $\vec{f}_{x(RES)} = \vec{F}_{Ax} + \vec{F}_{Bx}$ $\vec{f}_{x(RES)} = 200 - 321.39$ $\vec{f}_{x(RES)} = 121.39N$ left✓	$F_{Y(RES)}$ $\vec{f}_{y(RES)} = \vec{F}_{By} + \vec{F}_{By}$ $\vec{f}_{y(RES)} = 306.42 + 346.41$ $\vec{f}_{y(RES)} = -19.91N$ $\vec{f}_{y(RES)} = 652.83N$ upwards✓
	$\vec{F}^2_{\text{Res}} = \vec{F}^2_{x(\text{Res})} + \vec{F}^2_{y(\text{Res})}$ ✓ $\vec{F}_{\text{Res}} = \sqrt{(121.39)^2 + (652.39)^2}$ ✓ $\vec{F}_{\text{Res}} = 663.59N$ ✓ (5)	
4.3	$\tan\theta = \frac{\vec{F}_{yres}}{\vec{F}_{xres}}$ ✓ $\theta = \tan^{-1}\left[\frac{652.39}{121.39}\right]$ ✓ $\theta = 79.56^0$ ✓ ∴ bearing of (270° +79.56°) 349.46° ✓✓ (5)	

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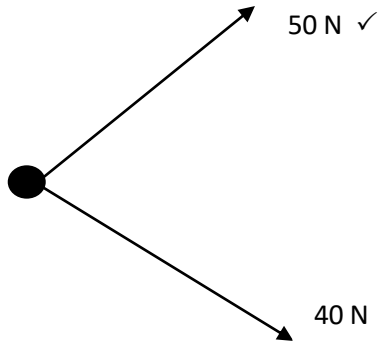
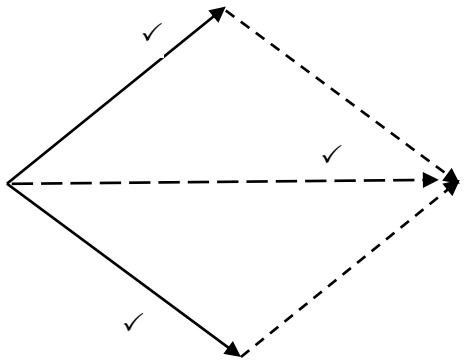
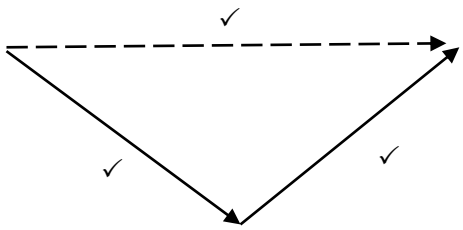
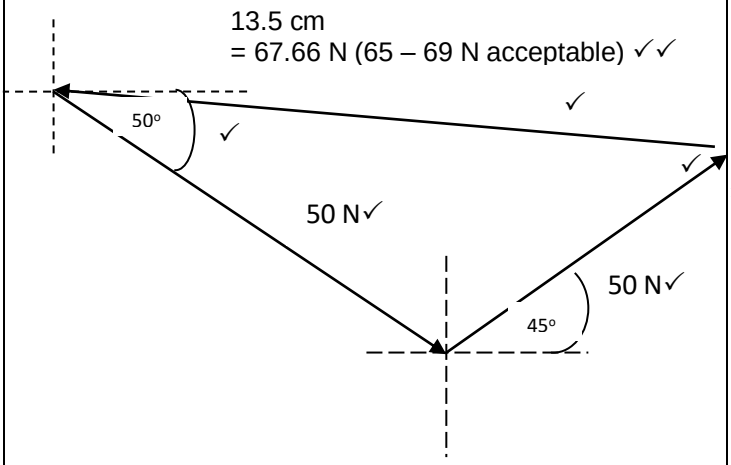
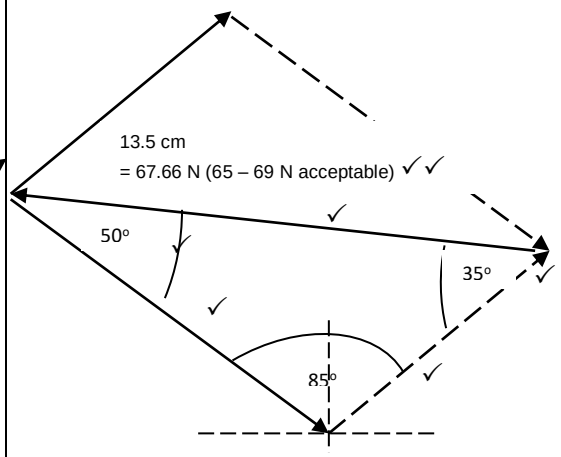
QUESTION 5

5.1	 (2)	
5.2	Tail to tail	tail to head
	 NB: Free Hand Not to scale	**OR**  NB: Free Hand Not to scale (3)
5.3	tail to head	Tail to tail
		 (7)

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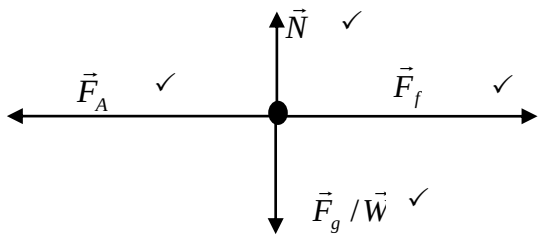
QUESTION 6

6.1.1.	A force that acts between an object and the surface when there is movement. ✓✓ **Or** Force that act between two surfaces when the object is moving✓✓ (2)
6.1.2.	A perpendicular force exerted by a surface on an object resting on it. ✓✓ (2)
6.2.1	 (4)
6.2.2	$\vec{N} = \vec{W} = mg$ ✓ $= (25)(9.8)$ ✓ $\vec{N} = 245N$ ✓ (3)
6.2.3	$\vec{F}_s^{max} = \mu_s N$ ✓ $= (0.2)(245)$ ✓ $= 49N$ ✓ (3)

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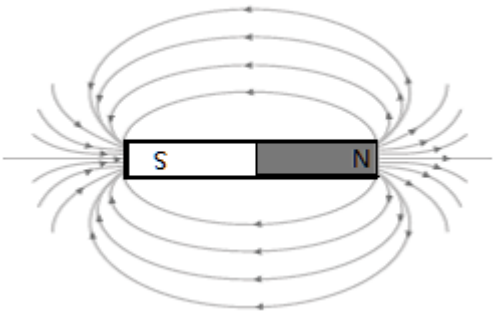
QUESTION 7

7.1	A material that can attract other materials and has two poles called north and south✓✓ **Or** An object that has a pair of opposite poles called north and south✓✓ (2)
7.2.1.	Magnetic field lines✓ (1)
7.2.2.	The invisible lines can be shown by using iron fillings and a blank page" • Put the magnet on a flat surface ✓ • Put a blank page over the magnet ✓ • Slowly sprinkle the iron fillings on top of the page as you are pouring them ✓ • Place a compass around the magnet to determine the direction of the magnetic field lines ✓ (4)
7.3	They should never touch one another ✓ They must be evenly spaced ✓ The must point from north to south✓ (3)
7.4.1	a – South Pole ✓ b – North pole ✓ (2)
7.4.2	On the poles the magnetic field lines do not have directions✓ (1)
7.4.3	 Directions indicated on the both poles ✓✓ (2)
7.5.	Dropping ✓ Heating ✓ Hitting ✓ (3)
7.6.1	**Magnetosphere** ✓ (1)
7.6.2.	The function of the magnetic field around the earth is to protect the earth from ions from the outer space ✓✓ (2)

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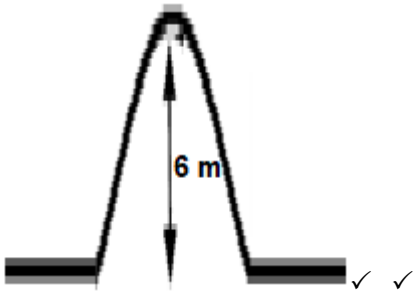
QUESTION 8

8.1.1	Distance between any two successive points that are in phase on a wave ✓✓ (2)
8.1.2	The highest point of a wave ✓✓ Or The upper most point on a wave ✓✓ (2)
8.1.3	The time taken to complete one full vibration ✓✓ (2)
8.1.4	The maximum displacement of a wave a Particle or a pulse from the rest position ✓✓ (2)
8.1.5.	Is a phenomenon that occurs when two pulses that are in phase meet (2)
8.2.1	When two waves meet at the same point simultaneously, the net amplitude is simple the algebraic sum of the amplitudes of the two individual wave displacements. ✓✓ (2)
8.2.2.	$A_{(Net)} = A_a + A_b$ $= 3 + 3$ ✓ $A_{(Net)} = 6\,m$ ✓ (2)
8.2.3.	 ✓ ✓ (2)
8.3.1	Amplitude ✓ (1)
8.3.2	4 ✓ (1)
8.4.1	$d = \frac{8}{4}$ ✓ = 2 m✓ (3)
8.4.2	$d = \frac{4}{2}$ ✓ $d = 2\,m$ ✓ (2)
8.5.1.	$T = \frac{1}{f}$ ✓ $T = \frac{1}{600}$ ✓ $T = 1.67 \times 10^{-3}$ s ✓ (3)

8.5.2.	<u>Option 1</u> $V = \frac{\lambda}{T}$ ✓ $343 = \frac{\lambda}{1.67\text{x}10^{-3}}$ ✓ $\lambda = 0.57\text{m}$ ✓ (3) <u>Option 2</u> $V = f\lambda$ ✓ $343 = (600)\lambda$ ✓ $\lambda = 0.57\text{m}$ ✓ (3)
8.5.3	$\vec{v} = \frac{\Delta x}{\Delta t}$ ✓ $343 = \frac{\Delta x}{6}$ ✓ $= 343 \times 6$ $\Delta x = 2058$ m ✓ $\therefore$ Distance between him and the other wall is $\frac{2058}{2} = 1029$ m ✓ Or $\frac{6}{2} = 3\text{sec}$ ✓ $\vec{v} = \frac{\Delta x}{\Delta t}$ ✓ $343 = \frac{\Delta x}{3}$ ✓ $\Delta x = 1029$ m ✓ (4)

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[TOTAL: 150]