Province of the
EASTERN CAPE
EDUCATION

AMATHOLE WEST DISTRICT

GRADE 11



PHYSICAL SCIENCES P1

MAY/JUNE 2024

MEMORANDUM

MARKS: 100

This memorandum consists of 6 pages

Copyright reserved

QUESTION 1

1.1 B✓✓ (2)

1.2 A✓✓ (2)

1.3 B✓✓ (2)

1.4 B✓✓ (2)

1.5 D✓✓ (2)

1.6 C✓✓ (2)

1.7 A✓✓ (2)

[14]

QUESTION 2

2.1.1 Single vector having the same effect as two or more vectors together. ✓✓ (2)

2.1.2 $F_x = 14 \cos 40°$✓
$F_x = 10.72$ N✓ (2)

n2.1.3 $R_x = 18 - 10.72$
$R_x = 7.28$ N✓

$R^2 = R_x^2 + R_y^2$
$(13.19)^2 = (7.28)^2 + R_y^2$✓
$R_y = 11$ N✓

$F_{y1} = 14 \sin 40°$
$F_{y1} = 9$ N✓

$R_y = F_{y2} - F_{y1}$
$11 = F - 9$
$F = 20$ N✓ (5)

2.2.1 Net /resultant force at a point is ZERO. ✓ (1)

2.2.2 $w = mg$✓
$w = (2)(9.8)$ ✓
$w = 19.6$ N✓ (3)

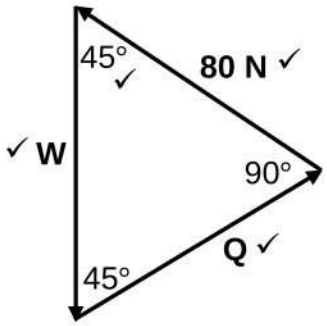
2.2.3

Option 1	Option 2
Q cos 45° ✓= 19.6✓ Q = 27.72 N✓	Q sin 45° ✓= 19.6✓ Q = 27.72 N✓

(3)

Copyright reserved

2.2.4

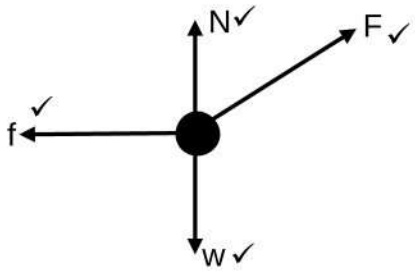


(4)
[20]

QUESTION 3

3.1 Resistance of an object to any change in its state of motion. ✓✓ (2)

3.2



(4)

3.3.1 $F_x + (-f) = 0$✓
45 cos 55° ✓+ $(-f) = 0$
f = 25.81 N✓ (3)

3.3.2 $N = w - F_y$
N = (6)(9.8) ✓ – 45 sin 55°✓
N = 21.94 N✓ (3)

3.4 INCREASES. ✓
- *Normal force increases.* ✓
- *Frictional force directly proportional to the normal force*/f ∝ N✓ (3)

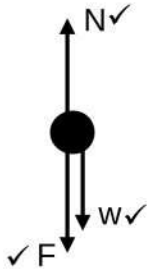
[15]

Stanmorephysics.com

QUESTION 4

4.1 $F_{net} = ma$✓
$8 - (5)(9.8)$ ✓ $- T = (5)(2)$ ✓
$T = 51$ N✓ (4)

4.2



(3)

4.3 When a resultant/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*. ✓ (2)

4.4 $F_{net} = ma$✓
$T - m(9.8)$ ✓ $= m(2)$
$m = 4.32$ kg✓ (3)

[12]

QUESTION 5

5.1 *Weight is the gravitational force exerted by the Earth on an object*✓, whilst *mass is the amount of matter in a body.*✓ (2)

5.2 Gradient $= \frac{\Delta w}{\Delta m}$✓
$= \frac{2.6-0}{0.7-0}$ ✓
$= 3.71$ N/kg or m.s^{-2}✓ (***3.60 – 3.90***) (3)

5.3 $g = 3.71$ m.s^{-2}✓ (1)

5.4 Mars✓ (1)

5.5 $g = \frac{G\,M}{r^2}$ ✓
0.58✓ $= \frac{(6.67 \times 10^{-11})M}{(1.19 \times 10^{6})^2}$✓
$M = 1.23 \times 10^{22}$ kg✓ (4)

[11]

QUESTION 6

6.1
$$\varepsilon = -N\frac{\Delta\phi}{\Delta t}\checkmark$$
$$\varepsilon = -(17)\checkmark\frac{(\pi)(0.3)^2\cos 0°\,(-2\times10^{-4}-3\times10^{-4})\checkmark}{1.5\checkmark}$$
$$\varepsilon = 1.60\times10^{-3}\text{ V.}\checkmark$$
(5)

6.2
- Increase relative speed between magnet and the coil. ✓
- Increase magnetic strength. ✓
- Increase number of turns in a coil ✓ (Any one)

(1)

[06]

QUESTION 7

7.1
$$F = \frac{KQ_1Q_2}{r^2}\checkmark$$
$$F = \frac{(9.0\times10^9)(2\times10^{-9})(3\times10^{-9})\checkmark}{(0.25)^2\checkmark}$$
$$F = 8.64\times10^{-7}\text{ N}\checkmark$$
(4)

7.2 Electrostatic force experienced per unit positive charge placed at that point. ✓✓ (2)

7.3
$$E = \frac{KQ}{r^2}\checkmark$$
$$E_1 = \frac{(9.0\times10^9)(2\times10^{-9})}{(0.4)^2}\checkmark$$
$$E_1 = 112.5\text{ N.C}^{-1}$$

$$E_2 = \frac{(9.0\times10^9)(3\times10^{-9})}{(0.4-0.25)^2}$$
$$E_2 = 1200\text{ N.C}^{-1}\checkmark$$

(5)

$$E_{net} = 1200 + (-112.5)\checkmark$$
$$E_{net} = 1087.5\text{ N.C}^{-1}\checkmark$$

[11]

Copyright reserved

QUESTION 8

8.1 $R = \frac{V}{I}$✓

$8 = \frac{21.84}{I}$ ✓

$I = 2.73\ A$ ✓ (3)

8.2

$R = \frac{R_1 \times R_2}{R_1 + R_2}$ ✓ (3)

$R = \frac{20 \times 30}{20+30}$✓

R = 12 Ω✓

OR

$\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2}$ ✓

$\frac{1}{R_p} = \frac{1}{20} + \frac{1}{30}$ ✓

Rp = 12 Ω✓

8.3 $\varepsilon = I (R_{ext} + r)$ ✓

60✓ = 2.73 (20 + r) ✓

r = 1.98Ω✓ (4)

8.3 GREATER✓ (1)

8.4

- *Total resistances increase because there are more (two) resistors connected in series*. ✓

(1)

[11]

TOTAL: 100

Copyright reserved