Province of the
EASTERN CAPE
EDUCATION

O.R TAMBO INLAND DISTRICT

GRADE 11

PHYSICAL SCIENCES: PHYSICS (P1)

JUNE 2023 EXAMINATIONS

MEMORANDUM

MARKS: 100

Stanmorephysics

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QUESTION 1

1.1 B✓✓ (2)

1.2 B✓✓ (2)

1.3 C✓✓ (2)

1.4 C✓✓ (2)

1.5 B✓✓ (2)

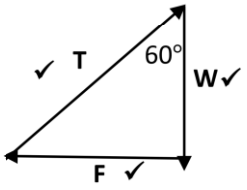
1.6 C✓✓ (2)

[12]

QUESTION 2

2.1 The resultant of the force is zero.✓✓ (2)

2.2



(3)

2.3

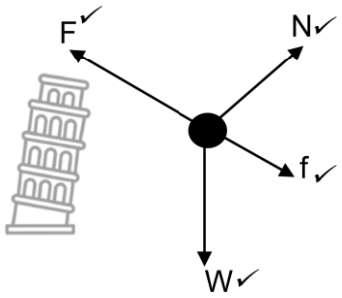
Option 1	Option 2
tan 60° $= \frac{F}{55}$✓	tan 30° $= \frac{55}{F}$✓
F = 55 tan 60°	F = $\frac{55}{\tan 30°}$
= 95.26 N✓	= 95.26 N✓
cos 60° $= \frac{55}{T}$✓	sin 30° $= \frac{55}{T}$✓
T= $\frac{55}{\cos 60}$	T= $\frac{55}{\sin 30°}$
= 110 N✓	= 110 N✓

(4)

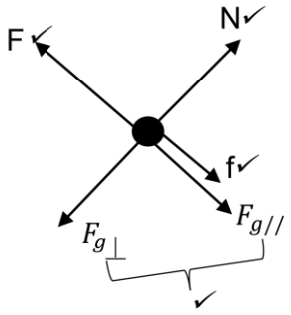
[09]

QUESTION 3

3.1



OR



(4)

3.2.1 F_{net} = ma✓
370 = 350 a✓
a = 1.06 m.s^{-2}✓ (3)

3.2.2 $f_k = \mu_k N$✓
f_k = (0.21)✓(350)(9.8)cos 35°✓
= 590.04 N✓ (4)

3.2.3 F_{net} = ma
F – f – $F_{g//}$ = ma
F – 590.04 – (350)(9.8)sin 30°✓ = 370✓
F = 1 494.96 N✓ (3)

[14]

QUESTION 4

4.1 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)

4.2 0/zero✓ (1)

4.3.1 F_{net} = ma
W – T = 0
(15)(9.8)✓ = T
T = 147 N✓ (2)

4.3.2 F_{net} = ma
T – Fx – f ✓= ma
147 – Fcos 25°✓ – 8 = 0✓
F = 153.37 N✓ (4)

4.3.3 $F_N + F_y = F_g$
$F_N = (10)(9.8)$✓ – $(153.37)\sin 25°$✓
$F_N = 33.18$ N
$f_k = \mu_k N$✓
$8 = \mu_k(33.18)$
$\mu_k = 0.24$✓ (4)

[13]

QUESTION 5

5.1 Each particle in the universe attracts every other particle with a *gravitational 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 $F = \frac{GQ\ m_1\ m_2}{r^2}$ ✓

2.65×10^3✓ $= \frac{(6.67 \times 10^{-11})(5.98 \times 10^{24})(380)}{r^2}$ ✓

$r = 7.56 \times 10^6$ m

distance = 7.56×10^6 m – 6.38×10^6 m✓
= 1.18×10^6 m✓ (5)

[07]

QUESTION 6

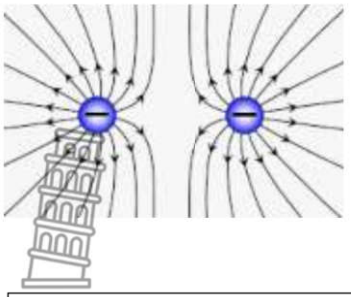
6.1.1 Inverse of force is directly proportional to the square distance between the charges.✓ (1)

6.1.2 gradient = $\frac{\Delta^1/_F}{r^2}$ ✓
$= \frac{8.0-0}{0.6-0}$ ✓
$= 13.33$

$F = \frac{k\ Q_1\ Q_2}{r^2}$ ✓
$Fr^2 = k\ Q_1\ Q_2$
$\frac{1}{13.33}$ ✓$= (9.0 \times 10^9)Q^2$✓
$Q = 2.89 \times 10^3$ C✓ (6)

6.2.1 NEGATIVE✓ (1)

6.2.2



Shape	✓
Lines not touching/ crossing each other	✓
Direction of arrows	✓

(3)

6.2.3 $E_A = \frac{k\,Q_A}{r^2}$ ✓

$= \frac{(9\times10^9)\times Q_A}{(0.15)^2}$ ✓

$E_B = \frac{k\,Q_B}{r^2}$

$= \frac{(9\times10^9)\times(6\times10^{-9})}{(0.25)^2}$ ✓

$= 864\ \text{N.}C^{-1}$

$E_A - E_B = E_{net}$

$\frac{(9\times10^9)\times Q_A}{(0.15)^2} - 864$ ✓ $= 6\times10^5$ ✓

$\frac{(9\times10^9)\times Q_A}{(0.15)^2} = 600864$

$Q_A = 1.50\times10^{-6}$ C ✓

(6)

[17]



QUESTION 7

7.1 The magnitude of the induced emf across the ends of a conductor is directly proportional to the rate of change in the magnetic flux linkage with the conductor.✓✓ (2)

7.2.1 $\varepsilon = -N\frac{\Delta\emptyset}{\Delta t}$✓

0.3✓ $= -(9)\ \frac{\Delta\emptyset}{2\times60}$✓

$\Delta\emptyset$ = 4 Wb✓ (4)

7.2.2 $\Delta\emptyset = (B_f - B_i)A.Cos\theta$✓

4 = (12 – 0.12)✓$\pi r^2 Cos0^\circ$✓

r = 0.33 m ✓ (4)

[10]

QUESTION 8

8.1.1 $I = \frac{V^2}{R}$ ✓

$9 = \frac{V^2}{4}$✓

V = 6 V✓ (3)

8.1.2 $V_{3\Omega}$ = 12 V – 6 V

= 6 V✓

$R = \frac{V}{I}$ ✓

$3 = \frac{6}{I}$ ✓

I = 2 A✓ (4)

8.1.3

$I_4 = \frac{V}{R}$	OR	$P = I^2R$	OR	P = VI
$= \frac{6}{4}$ ✓		$9 = I^2(4)$✓		9 = 6I✓
= 1.5 A✓		I = 1.5 A✓		I = 1.5 A✓

I_R = 2 A – 1.5 A

= 0.5 A✓

V_R = 6 V

$R = \frac{V}{I}$

$= \frac{6}{0.5}$ ✓

= 12 Ω✓ (5)

8.1.4

Option 1	Option 2
$R_{//} = \frac{R_1 \times R_2}{R_1 + R_2}$ $= \frac{(4+3)\times 12}{(4+3)+12}$ ✓ = 5.15 Ω ✓	$\frac{1}{R_P} = \frac{1}{R_1} + \frac{1}{R_2}$ $\frac{1}{R_P} = \frac{1}{4+3} + \frac{1}{12}$ ✓ R_P = 5.15 Ω ✓

(2)

8.2.1 E = P × Δt

$= \frac{1500}{1000} \times 3$✓

= 4.5 kWh✓ (2)

8.2.2 Energy per month = 4.5 kWh × 30

= 135 kWh✓

Cos = 135 × 2.60

= R 351✓ (2)

[18]

TOTAL: 100

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