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Education

KwaZulu-Natal Department of Education
REPUBLIC OF SOUTH AFRICA

PHYSICAL SCIENCES

PAPER 1

MARKING GUIDELINES

COMMON TEST

NATIONAL

SENIOR CERTIFICATE

GRADE 11

NB: This marking guideline consists of 6 pages.

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QUESTION 1

1.1 A ✓✓
1.2 D ✓✓
1.3 B ✓✓
1.4 C✓✓
1.5 D ✓✓

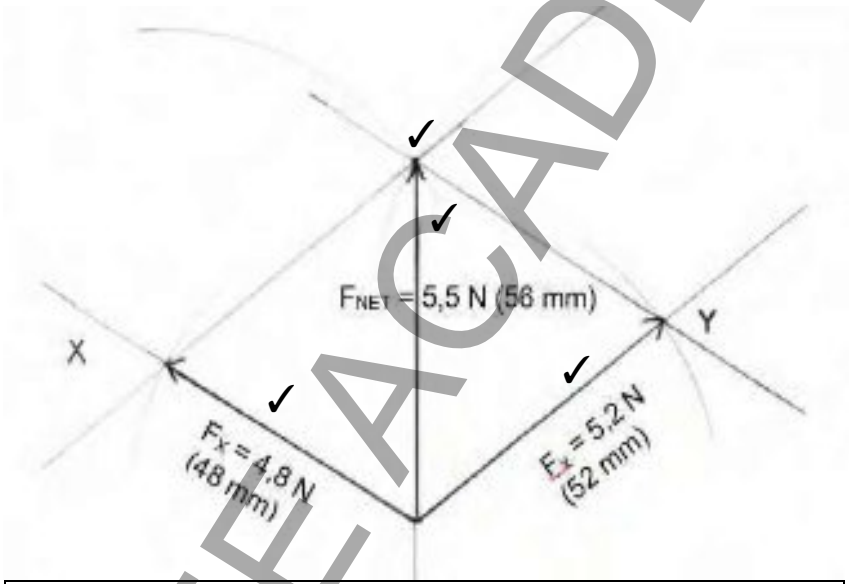
[10]

QUESTION 2

2.1.1 A single force having the same effect as two or more forces together at a point. ✓✓ (2)

2.1.2 Changes the direction of the forces✓ without changing the magnitude.✓ (2)

2. 1. 3



(4)

Marking Rubric : Scale Diagram	
Criteria	Mark allocation
Forces F_X and F_Y correctly plotted using ANY SCALE	2 x 1 = (2)
Resultant force is correctly drawn by completing the parallelogram accurately.	(1)
Accept a range of : F_{NET}	5,2 N – 5,7 N (1)

2.1.4 Equilibrant ✓ (1)

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QUESTION 3

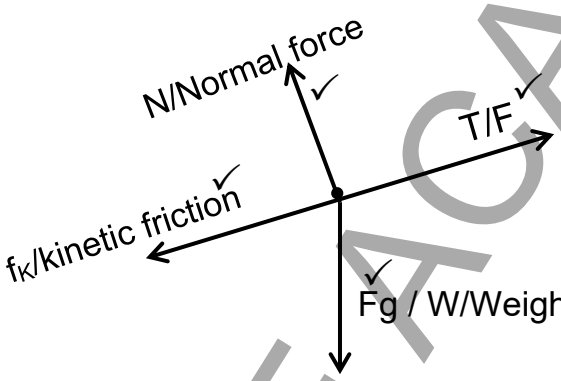
3.1.1 $f_K = \mu_K \cdot N$ ✓
$= 0,025 \times (82,5)(9,8)$ ✓
$= 20,213$ N

$F_{NET} = ma$
$F + (-f_K) = ma$ ✓ any one
$F + (-20,213) = 82,5(2,33)$ ✓
$F = 212,44$ N ✓ (5)

3.1.2 It has a smaller co-efficient of kinetic friction ✓ as compared to the block being in direct contact with the floor, hence a smaller kinetic frictional force ✓ (2)

3.2.1 When a resultant/net force acts on an object, the object will accelerate in the direction of the force. The acceleration is directly proportional to the net force ✓ and inversely proportional to the mass of the object. ✓ (2)

3.2.2



Note: If the components of the weight are provided, no marks to be avoided for Fg

(4)

3.2.3 **7 kg mass**

$F_{g//} = mg\sin\Theta$
$= 7(9,8) \sin 37° = 41,285$ N

$F_{net} = ma$

$T + (-f_K) + (-F_{g//}) = ma$ ✓

$T - 13,13 - 7(9,8) \sin 37°$ ✓ $= 7a$ ✓

$T - 54,415 = 7a$ …..(1)
$T = 77,70$ N ✓

12 kg mass

$F_{net} = ma$
$W - T = ma$ ✓
$(12 \times 9,8) - T = 12a$ ✓

$-T + 117,6 = 12a$ …(2)

(6)
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QUESTION 4

4.1 Every body in the universe attracts every other body 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. ✓
(Marks must only be awarded if the definition is in context of the gravitational law) (2)

4.2 $W = mg$
$1 \times 10^6 = m(9,8)$ ✓
$m = 1,02 \times 10^5$ kg

$$F = \frac{Gm_1m_2}{r2} \checkmark$$

$$F = \frac{(6,67 \times 10^{-11})(5,98 \times 10^{24})(8,98 \times 10^{4})}{(6,4 \times 10^6 + 1 \times 10^6)^2} \checkmark \checkmark$$

$= 6,54 \times 10^5$ N ✓ (5)

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QUESTION 5

5.1.1 TO THE LEFT✓ (1)

5.1.2 TRANSFERRED TO P✓
P has a bigger deficiency of electrons. ✓ (2)

5.1.3 $F = \frac{kQ_1Q_2}{r^2}$ ✓
$1,2 = \frac{(9\times10^9)(7,5\times10^{-6})(7,5\times10^{-6})}{x^2}$ ✓
x = 0,65 m ✓ (3)

NOTE: If any other value is used for Coulomb's const (k), award marks for substitution and final answer if it is computed correctly

5.2 $E_{A\rightarrow Y} = \frac{kQ}{r^2}$ ✓

$= \frac{(9\times10^9)(6\times10^{-9})}{(0,2)^2}$ ✓
= 1350 NC^{-1}

$E_{B\rightarrow Y} = \frac{kQ}{r^2}$

$= \frac{(9\times10^9)(2\times10^{-9})}{(0,3)^2}$ ✓
= 200 N·C^{-1}

E_{NET} = 1350 + 200 ✓
= 1550 N·C^{-1} ✓ (5)

[11]

QUESTION 6

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

6.2 Increase speed at which the magnet is moved relative to the coil ✓
Increase the number of turns in the coil ✓
Use stronger magnets (accept any 2) (2)

6.3 North pole (1)

6.4 Remove this question.

Question 6 will be reduced to 5 marks, and then converted to 8 marks.

Mark obtained	0	1	2	3	4	5
Converted mark	0	2	3	5	6	8

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QUESTION 7

7.1
$$r = \frac{V_{lost}}{I} \checkmark$$
$$0,5 = \frac{0,6}{I} \checkmark$$
$I_{8\Omega}$ = 1,2 A ✓ (3)

7.2 **Positive marking from Question 7.1**

$V_{8\Omega}$ = IR_8
= 1,2 x 8 ✓
= 9,6 V
V_p = V_{ext} - $V_{8\Omega}$
= 11,4 - 9,6 ✓ = 1,8 V

V_p = I_4R_4
1,8 = I_4 x 4 ✓
I_4 = 0,45 A ✓ (4)

7.3 **Positive marking from Question 7.2**

OPTION 1

ε = IR + Ir
12 = 1,2 (8 + R_P) + 1,2 (0,5) ✓
R_P = 1,5 Ω

$$\frac{1}{R_P} = \frac{1}{R_1} + \frac{1}{R_2} \checkmark$$

OPTION 2

V_{ext} = I_{TOT} x R_{ext}
11,4 = 1,2 x R_{ext} ✓
R_{ext} = 9,5 Ω

R_p = R_{ext} - R_8
= 9,5 - 8
= 1,5 Ω

$$\frac{1}{1,5} = \frac{1}{R} + \frac{1}{4} \checkmark$$
R = 2,4 Ω ✓

OPTION 3

I_R = I_{TOT} - I_4
= 1,2 - 0,45 ✓ = 0,75 A

V_R = I_R x R ✓
1,8 = 0,75 x R ✓
R = 2,4 Ω ✓ (4)

[11]

TOTAL : 75 MARKS

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