KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

PROVINCIAL STANDARDISED ASSESSMENT

GRADE 11

PHYSICAL SCIENCES P1 (PHYSICS)

MARKING GUIDELINE

JUNE 2026

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MARKS: 100

DURATION: 2 hours

This marking guidelines consists of 8 pages.

NOTE:

For the definitions (Questions 2.1, 3.1, 4.2.1, 5.1 and 6.1), subtract 1 mark for each key phrase that is omitted or stated incorrectly. The key phrases are underlined.
The definitions must be in the correct context e.g. if reference is made to charges in the statement of Newton's Law of Universal Gravitation, or to masses in Coulomb's Law, then no marks should be awarded.

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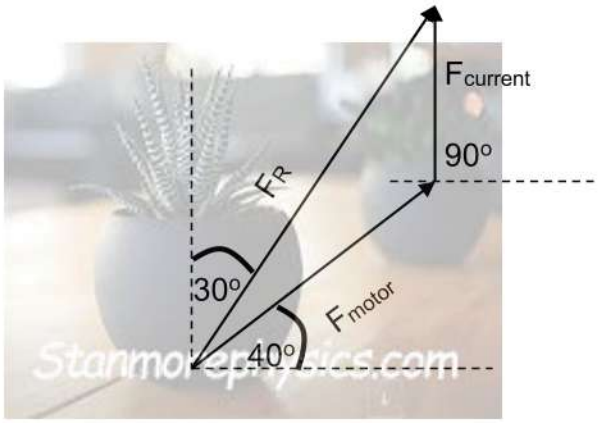
QUESTION 1:

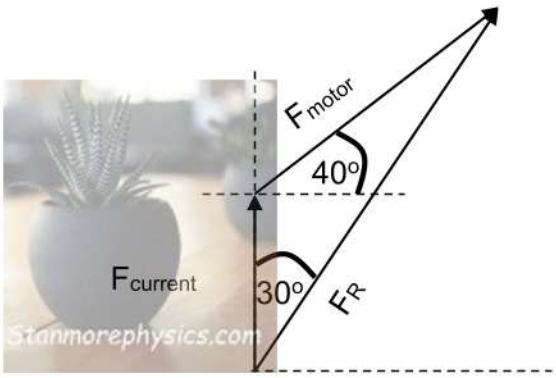
1.1 B ✓✓ (2)
1.2 B ✓✓ (2)
1.3 D ✓✓ (2)
1.4 A ✓✓ (2)
1.5 C ✓✓ (2)
1.6 C ✓✓ (2)
1.7 B ✓✓ (2)
[14]

QUESTION 2

2.1 A single <u>vector</u> that has <u>the same effect as two or more vectors</u> <u>added/acting together</u>. ✓✓ (2)

2.2 **<u>OPTION 1</u>** **<u>OPTION 2</u>**





F_R is 1820 N at a bearing of 30° / 60° north of east / 30° east of north

<u>Marking Criteria</u>:

- F_{motor} correctly drawn and labelled as a **6 cm arrow** at an angle of **40° with the horizontal** ✓
- $F_{current}$ correctly drawn and labelled as a **4 cm arrow due north** ✓
- F_R drawn and labelled from the starting of the first vector to the end of the last vector✓
- Magnitude of F_R: 1820 N (Accept 1800 N to 1840 N) ✓
- Direction of F_R: bearing of 30° / 60° north of east / 30° east of north (Accept bearing of 28° – 32°) ✓

Note: For each of the first three marks, the direction of the arrows must be correct.

(5)

[7]

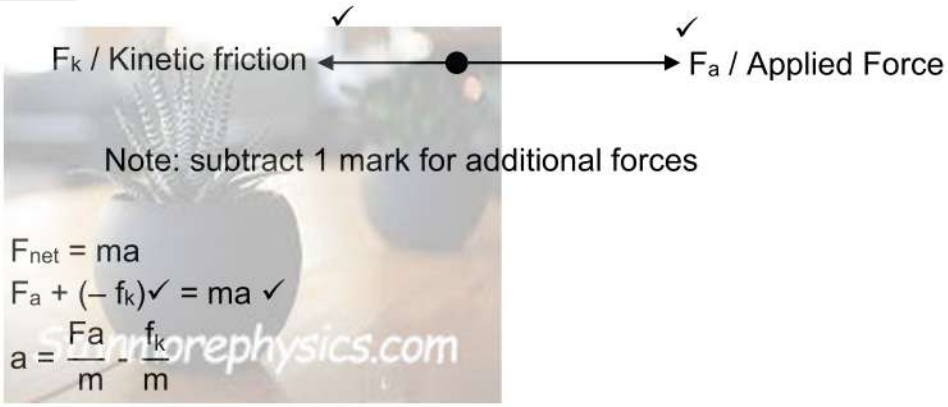
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QUESTION 3

3.1 The force that opposes the tendency of motion of a stationary object✓ relative to a surface. ✓ (2)

3.2 6N Left ✓ (1)

3.3 (2)



3.4 $F_{net} = ma$

$F_a + (-f_k)$✓ $= ma$ ✓

$a = \frac{Fa}{m} - \frac{f_k}{m}$

(2)

3.5 **OPTION 1** {Note: Substitute any two sets of co-ordinates}

$a = \frac{Fa}{m} - \frac{f_k}{m}$

$1 = \frac{10}{m} - \frac{f_k}{m}$ ✓

$\frac{f_k}{m} = \frac{10}{m} - 1$ ……eqn (1)

$2 = \frac{14}{m} - \frac{f_k}{m}$ ✓

$\frac{f_k}{m} = \frac{14}{m} - 2$ ……eqn (2)

$\frac{10}{m} - 1 = \frac{14}{m} - 2$

$m = 4$ kg ✓

OPTION 2

$\text{Gradient} = \frac{2 - 0,5}{14 - 8}$ ✓ {Note: Substitute any two sets of co-ordinates}

$= 0,25$

$\text{mass} = \frac{1}{\text{Gradient}}$

$\text{mass} = \frac{1}{0,25}$ ✓

$= 4$ kg✓

(3)

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3.6 **POSITIVE MARKING FROM 3.5**

$f_s^{max} = \mu_s N$✓

7✓ $= \mu_s \times (4 \times 9,8)$ ✓

$\mu_s = 0,18$✓ (4)

3.7 **POSITIVE MARKING FROM 3.5**

OPTION 1 {Substitute into any of the 2 equations from 3.5}

$\frac{f_k}{m} = \frac{10}{m} - 1$

$\frac{f_k}{4} = \frac{10}{4} - 1$✓

$f_k = 6N$✓

OPTION 2

$F_a - f_k = ma$

$10 - f_k = 4 \times 1$ ✓ {Note: Substitute any set of co-ordinates)

$f_k = 6N$✓ (2)

[16]

QUESTION 4

4.1.1 **OPTION 1**

$\Delta x = v_i \Delta t + \frac{1}{2} a \Delta t^2$ ✓

$0,7$ ✓ $= 0(0,536) + \frac{1}{2} a (0,536)^2$ ✓

$a = 4.87\ m \cdot s^{-2}$

OPTION 2

$v_{av} = \frac{\Delta x}{\Delta t}$

$= \frac{0,7}{0,536}$✓

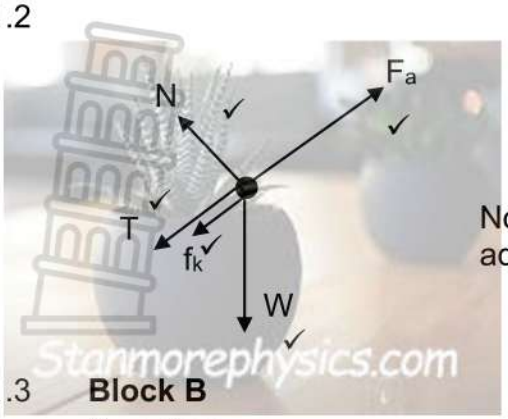
$= 1,306\ m \cdot s^{-1}$ (instantaneous velocity at $\frac{0,536}{2}$ seconds)

$a = \frac{\Delta v}{\Delta t}$✓

$= \frac{(1,306 - 0)}{\frac{0,536}{2}}$✓

$a = 4.87\ m \cdot s^{-2}$ (3)

4.1.2 (5)



Note: subtract 1 mark for additional forces

4.1.3 **Block B**

$F_{net} = ma$ } ✓ Any one

$F_a + (-f_k) + (-fg_{\parallel}) + (-T) = ma$

$\underline{112 + (-5) - 7 \times 9{,}8\sin 35^o + (-T) = 7 \times 4{,}87}$ ✓

$T = 33{,}56$ N

Block A

$F_{net} = ma$

$T + (-fg_{\parallel}) + (-f_k) = ma$

$\underline{33{,}56 - m \times 9{,}8\sin(35^o) - 3}$ ✓ $= \underline{m \times 4{,}87}$ ✓

$m = 2{,}91$ kg ✓ (5)

4.1.4 Greater than✓

(Even though the string no longer exerts a force on block A) Block A continues to move up the slope due to its inertia. ✓ (2)

4.2.1 Every body in the universe attracts every other body with a gravitational <u>force</u> that is <u>directly proportional to the product of their masses</u>✓ and <u>inversely proportional to the square of the distance between their centres</u>. ✓ (2)

4.2.2 $F = \dfrac{Gm_1m_2}{r^2}$

$2{,}34 \times 10^{20}$ ✓ $= \dfrac{6{,}67\times10^{-11}\times 5{,}98\times10^{24}\times 7{,}35\times10^{22}}{r^2}$ ✓

$r = 3{,}5396 \times 10^8$ m

$r_{moon} = 3{,}5396 \times 10^8 - (6{,}4\times10^6 + 3{,}46\times10^8)$ ✓

$= 1{,}56 \times 10^6$ m

$g = \dfrac{GM}{r^2}$ ✓

$= \dfrac{6{,}67\times10^{-11}\times7{,}35\times10^{22}}{(1{,}56\times10^6)^2}$ ✓

$= 2.01$ m·s^{-2} ✓ (range : 1.92 m·s^{-2} – 2.02 m·s^{-2}) (6)

[23]

QUESTION 5

5.1 The magnitude of the electrostatic force exerted by two point charges on each other is directly proportional to the product of (the magnitude of) the charges✓ and inversely proportional to the square of the distance between them. ✓ (2)

5.2
$$F_{SR} = \frac{kQ_SQ_R}{r^2} \checkmark$$
$$= \frac{9 \times 10^9 \times 5 \times 10^{-6} \times 3 \times 10^{-6}}{0,4^2} \checkmark$$
$$= 0,84 \text{ N} \checkmark$$ (3)

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5.3
$$E_R = \frac{kQ}{r^2} \checkmark$$
$$= \frac{9 \times 10^9 \times 3 \times 10^{-6}}{x^2} \checkmark$$

$$E_S = \frac{kQ}{r^2}$$
$$= \frac{9 \times 10^9 \times 5 \times 10^{-6}}{(0,4 - x \checkmark)^2} \checkmark$$

$$E_S = 3E_R$$
$$\frac{9 \times 10^9 \times 5 \times 10^{-6}}{(0,4 - x)^2} = 3 \times \left[\frac{9 \times 10^9 \times 3 \times 10^{-6}}{x^2}\right] \checkmark$$
$$x = 0,23 \text{ m} \checkmark$$ (6)

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5.2
$$E = \frac{F}{q} \checkmark$$
$$2,07 \times 10^6 = \frac{F}{1,6 \times 10^{-19}} \checkmark$$
$$= 3,31 \times 10^{-13} \text{ N} \checkmark \text{ West} \checkmark$$ (4)

[15]

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 that is linked with the conductor. ✓✓ (2)

6.2 $\varepsilon = -N\frac{\Delta\Phi}{\Delta t}$ ✓

$0,43 = -150 \times \frac{\Delta\Phi}{0,2}$ ✓

$\Delta\Phi = -5,73 \times 10^{-4}$ Wb ✓ (3)

6.3 **POSITIVE MARKING FROM 6.2**

$\Delta\Phi = \Phi_f - \Phi_i$

$-5,73 \times 10^{-4}$ ✓ $= 0 - 0,5 \times A \times \cos 50^o$ ✓

$A = 1,78 \times 10^{-3}\ m^2$ ✓ (3)

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[8]

QUESTION 7

7.1 The rate at which work is done OR The rate at which energy is transferred. ✓✓ (2 OR 0) (2)

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7.2.1 $\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2}$

$= \frac{1}{4} + \frac{1}{6}$ ✓

$= 2,4\ \Omega$ ✓ (2)

7.2.2 **OPTION 1**

POSITIVE MARKING FROM 7.2.1

$V = IR$ ✓

$4,8 = I \times 2,4$ ✓

$I = 2$ A ✓

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OPTION 2

$V_{4\Omega} = IR$ ✓

$4,8 = I \times 4$

$I_{4\Omega} = 1,2$ A ✓ (both equations)

$V_{4\Omega+2\Omega} = IR$

$4,8 = I \times 6$

$I_{4\Omega+2\Omega} = 0,8$ A

$I_T = 1,2 + 0,8$

$= 2$ A✓ (3)

7.2.3 **POSITIVE MARKING FROM 7.2.1 AND 7.2.2**

OPTION 1

emf (ε) = I(R + r) ✓

12 = 2 (2,4 + 3✓ + r) ✓

r = 0,6 Ω ✓

OPTION 2

V_{bulb} = IR

= 3 x 2

= 6V

V_{lost} = Ir ✓

12 – (6 + 4,8 ✓) = 2r ✓

r = 0,6 Ω ✓

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(4)

7.2.4 **POSITIVE MARKING FROM 7.2.2**

OPTION 1

P = I^2R ✓

= 2^2 x 3 ✓

= 12 W ✓

OPTION 2

V_{bulb} = IR

= 3 x 2

= 6V

P = VI

= 6 x 2

= 12 W

OPTION 3

V_{bulb} = IR

= 3 x 2

= 6V

$P = \frac{V^2}{R}$ ✓

$P = \frac{6^2}{3}$ ✓

= 12 W ✓

(3)

7.3

- Decrease ✓
- (Since the total resistance increases) the total current will decrease. ✓
- Power is directly proportional to the square of the current / P α I^2 at a constant resistance. ✓

OR

A decrease in current results in a decrease in power at a constant resistance. ✓

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(3)

[17]

TOTAL: 100