LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 12

PHYSICAL SCIENCES: PHYSICS (P1)

ERRATA SEPTEMBER 2023

MARKING GUIDLINES

These Errata marking guidelines consist of 6 pages.

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QUESTION 1

1.10 **Accept**: letter **S**

QUESTION 2

2.1.1 The force that oppose the motion✓ of a moving object relative to the surface.✓ (2)

2.1.2 Marks allocation:

$F_{net} = ma$
$mg\sin\theta - \mu_k \cdot mg\cos\theta = ma$ Any one✓

$(2)(9,8)(\sin 30°)$✓ $- (0,20)(2)(9,8)(\cos 30°)$ ✓$= (2)\cdot a$✓
$\therefore a = 3,20259\ m\cdot s^{-2}$ $(3,20\ m\cdot s^{-2})$downhill✓

(2)

2.2

OPTION 1:	**OPTION 2:**
Mark awarded for: $F_{g(\text{inner walls})} = \frac{Gm_1m_2}{(7)^2}$	Factor (n) $= \frac{35\ m}{7\ m}$ ✓ $= 5$ $F_{g(\text{inner walls})} = \frac{Gm_1m_2}{(r)^2}$✓ $F_{g(\text{inner walls})} = \frac{Gm_1m_2}{\left(\frac{1}{5}r\right)^2}$✓ $F_{g(\text{inner walls})} = \frac{Gm_1m_2}{\frac{1}{25}r^2}$✓ $= 25\left(\frac{Gm_1m_2}{(r)^2}\right)$

(4)

QUESTION 3

3.1 **Accept:** An object upon which the only force acting is the gravitational force.

3.2.1

OPTION 2:	**OPTION 3:**
$\Delta y = \left(\frac{v_f + v_i}{2}\right)\Delta t$ $(50) = \left(\frac{31{,}36877 + 2}{2}\right)\Delta t$ $\therefore \Delta t = 2{,}997$ s or $\Delta t = (3{,}00$ s)	Marks allocation: $\Delta y = v_i\,\Delta t + \frac{1}{2}a(\Delta t)^2$ ✓ 50✓ $= (2)\Delta t + \frac{1}{2}(9{,}8)\Delta t^2$✓ $\therefore t = 2{,}997$ s✓$(3{,}00$ s)

3.2.2 **POSITIVE MARKING FROM 3.2.1**

$\Delta t = 2{,}997 - 1 = 1{,}997$ s✓

$\Delta t = 3{,}00 - 1 = 2{,}00$ s✓

3.2.3 **POSITIVE MARKING FROM 3.2.2 FOR:**

$\Delta t = 2{,}00$ s

$\Delta y = v_i\Delta t + \frac{1}{2}a\,(\Delta t)^2$

$50 = v_i(2) + \frac{1}{2}(9{,}8)(2)^2$

$\therefore v_i = 15{,}20$ m·s^{-1}

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QUESTION 4

4.3.1
Marks allocation:

OPTION 1	**OPTION 2:**
$F_{net} = ma$ Any one✓ $-f_k = ma$ $-\mu_K N = ma$ $-(0,20)(0,005 + 3)$✓ $(9,8) = (0,005+3)a$✓ $\therefore a = -1,96\ m{\cdot}s^{-2}$ $v_f^2 = v_i^2 + 2a\Delta x$✓ $(0)^2 = v_i^2 + 2(-1,96)(0,25)$ ✓ $V_i = 0,98995\ m{\cdot}s^{-1}$ $(0,99\ m{\cdot}s^{-1})$✓	$f_k = \mu_K N$ Any one✓ $= \mu_K mg$ $(0,2)(0,005 + 3)$✓ $(9,8)$ $F_k = 5,8898$ N, westwards $W_{net} = \Delta E_K$✓ $fk\Delta x\cos\theta = \frac{1}{2} m \left(v_f^2 - v_i^2\right)$ $(5,8898)(0,25)$ ✓$\cos 180° = \frac{1}{2}(3,00)\left(0^2 - v_i^2\right)$✓ $V_i = 0,99\ m{\cdot}s^{-1}$, eastwards✓

(6)

4.3.2

POSITIVE MARKING FROM 4.3.1 **Marks allocation:**
$\sum p_i = \sum p_f$ Any one✓ $m_b v_{b_i} + m_B v_{B_i} = (m_b - m_B) v_f$ $(0,005)v_{b_i} + (3)(0)$✓ $= (0,005+3)(0,98995)$✓ $v_{b_i} = 594,96\ m{\cdot}s^{-1}$ Eastwards. ✓

(4)

QUESTION 5

5.2

OPTION 1 and 2:
Consider m = 120 kg: $w = F\Delta y\cos\theta$ Any one✓ $w_W = mg\Delta y\cos\theta$ $= (120)(98)\cos 180°$ ✓ $= -7996,80$ J✓

5.3

POSITIVE MARKING FROM 5.2		
OPTION 2:	**OPTION 3:**	**OPTION 4:**
Consider mass = 120 kg: $W_{net} = \Delta E_k$✓ $W_{motor} + 6664 - (8330) = 0$ $W_{motor} = 1332{,}80$ J $P = \frac{W}{\Delta t}$ $P = \frac{1332{,}80}{0{,}01}$ = 1332 80 W	(m = 120 kg) $F_{net} = ma = 0$ $W_{motor} + F_{mp} + (-F_{load}) = 0$ ✓ $W_{motor}+(125)(9{,}8)$✓$-(100)(9{,}8)$✓$=0$ $F_{motor} = 245$ N $v_{ave} = \frac{\Delta x}{\Delta t}$ $= \frac{6{,}8}{0{,}01}$ ✓ $= 680\ m{\cdot}s^{-1}$ $P_{ave} = Fv_{ave}$ = (245)(680) = 166600 W✓	$F_{net} = ma = 0$ $W_{motor}+(120)(9{,}8)-(100)(9{,}8) = 0$ $F_{motor} = 196$ N $v_{ave} = \frac{\Delta x}{\Delta t}$ $= \frac{6{,}8}{0{,}01}$ $= 680\ m{\cdot}s^{-1}$ $P_{ave} = Fv_{ave}$ = (196)(680) = 1332 80 W

QUESTION 6

6.1.2

OPTION 2:	**OPTION 3:**	**OPTION 4:**
For calculating v_s: $\Delta y = \left(\frac{v_i + v_f}{2}\right)\Delta t$ $15{,}0 = \left(\frac{0 + v_f}{2}\right)(1{,}7496)$✓ $v_f = 14\ m{\cdot}s^{-1}$	$v_f^2 = v_i^2 + 2a\Delta y$ $=(0)^2 + 2(9{,}8)(15{,}0)$ $v_f = 14\ m{\cdot}s^{-1}$	$F_{net}\Delta t = \Delta p$ $mg{\cdot}\Delta t = m(v_i - v_f)$ $(9{,}8)(1{,}7496) = v_f - 0$ $v_f = 14\ m{\cdot}s^{-1}$

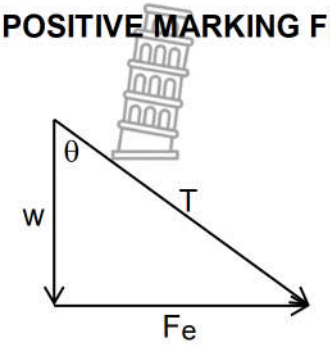
6.1.3 **Bullet 3:**

Frequency heard by the listener decreases.

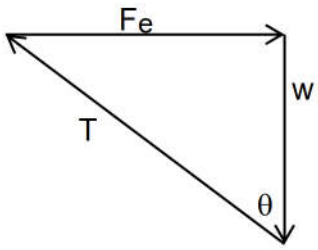
QUESTION 7

7.1.3 $k = 9 \times 10^{9}$

7.1.4 **POSITIVE MARKING FROM 7.1.3**



OPTION 3:



$w = mg$
$= (8 \times 10^{-2})(9,8)$
$= 0,764\ N$