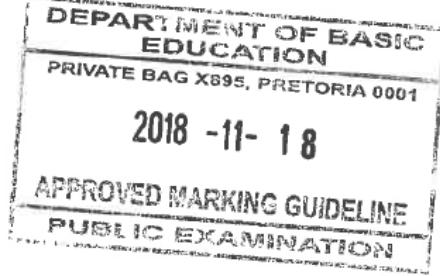


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1.5 C✓✓

QUESTION 5/VRAAG 5

- 5.1 The energy an object has because of its position in the gravitational field ✓ relative to some reference point. ✓ /Die energie wat 'n voorwerp het as gevolg van die posisie daarvan in die gravitasieveld relatief tot 'n sekere verwysingspunt. (2)
- 5.2 $E_p = mgh$ ✓
 $= (65)(9,8)(4,5)$ ✓
 $= 2\ 866,5\ J$ ✓ (3)
- 5.3 The net/total mechanical energy (sum of kinetic and gravitational potential energy) in an isolated/closed system ✓ remains constant/ is conserved ✓ /Die netto/totale meganiese energie in 'n geïsoleerde/geslote sisteem bly konstant/bly konstant. (2)
- 5.4 $(E_p + E_k)_{top/b0} = (E_p + E_k)_{bottom/onder}$ ✓
 $mgh + 0 = mgh + \frac{1}{2}mv^2$ ✓
 $(65)(9,8)(4,5)$ ✓ = $0 + \frac{1}{2}(65)v^2$ ✓
 $v = 9,39\ m\cdot s^{-1}$ ✓
- OR/OF**
- $(E_p + E_k)_{top/b0} = (E_p + E_k)_{bottom/onder}$ ✓
 $mgh + 0 = mgh + \frac{1}{2}mv^2$ ✓
 $2\ 866,5$ ✓ = $0 + \frac{1}{2}(65)v^2$ ✓
 $v = 9,39\ m\cdot s^{-1}$ ✓
- 

5.5

OPTION 1/OPSIE 1

$$(E_p + E_k)_{top/b0} = (E_p + E_k)_{bottom/onder}$$
 ✓
 $mgh + 0 = mgh + \frac{1}{2}mv^2$ ✓
 $(65)(9,8)h$ ✓ + $0 = 0 + \frac{1}{2} \times 65 \times (9,39)^2$ ✓
 $637\ h = 2\ 865,6$
 $h = 4,49\ m$

Ne✓/Nee. $h = 4,49\ m < 6\ m$ ✓

OPTION 2/OPSIE 2

$$E_p \text{ at } Y = mgh$$
 ✓
 $= (65)(9,8)(6)$ ✓
 $= 3\ 822\ J$ ✓

$E_{mech} < E_p \text{ at } Y$ ✓ therefore he will not reach point Y ✓ / $E_{mech} < E_p \text{ by } Y$ daarom sal hy nie punt Y bereik nie

(5)
[16]

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- | | | |
|-----|-----|-----|
| 1.4 | D✓✓ | (2) |
| 1.5 | C✓✓ | (2) |

QUESTION/VRAAG 5

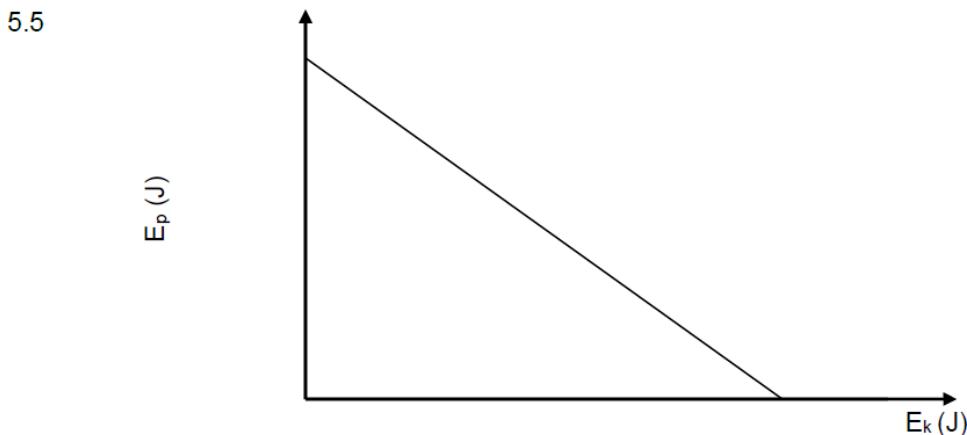
- 5.1 The energy an object has as a result of its motion. ✓✓
Die energie wat 'n voorwerp het as gevolg van sy beweging. ✓✓ (2)
- 5.2 $E_p = mgh$ ✓
 $= 72 \times 9,8 \times 100$ ✓
 $= 70\ 560\ J$ ✓ (3)
- 5.3 The sum of the gravitational potential energy and kinetic energy✓ in an isolated system is constant.✓
Die som van die gravitasie-potensiële energie en kinetiese energie ✓ *in 'n geïsoleerde/geslote stelsel bly behoue/konstant.* ✓

OR/OF

The total mechanical energy of an isolated system remains constant. ✓✓
Die totale mekaniese energie in 'n geïsoleerde/geslote stelsel bly behoue/konstant. ✓✓ (2)

5.4 **POSITIVE MARKING FROM QUESTION 5.2**
POSITIEWE NASIEN VANAF VRAAG 5.2

$$\begin{aligned} (E_p + E_k)_{top/bop} &= (E_p + E_k)_{bottom/onder} \\ mgh + 0 &= mgh + \frac{1}{2}mv^2 \\ 70\ 560 \checkmark &= (72)(9,8)(50) \checkmark + \frac{1}{2} \times 72 \times v^2 \checkmark \\ v &= 31,3\ m \cdot s^{-1} \checkmark \end{aligned} \quad \boxed{\qquad} \quad (5)$$



Marking criteria for graph <i>Nasienkriteria vir grafiek</i>	
Axes with correct/appropriate labels <i>Asse met korrekte/toepaslike byskrifte</i>	✓
Straight line with decreasing slope <i>Reguitlyn met afnemende helling</i> Lines not touching (deduct a mark) <i>Indien lyne nie die asse raak (trek een punt af)</i>	✓✓

(3)

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QUESTION 5/VRAAG 5

5.1 $14 \times \frac{3600}{1000} \checkmark$

$= 50,4 \text{ km}\cdot\text{h}^{-1} \checkmark$

OR/OF

$14 \times 3,6 \checkmark$
 $= 50,4 \text{ km}\cdot\text{h}^{-1} \checkmark$

(2)

- 5.2 The energy an object possesses as a result of its motion. $\checkmark \checkmark$
Die energie van 'n voorwerp as gevolg van die beweging daarvan.

(2)

5.3 $E_p = mgh \checkmark$
 $= 0,01 \times 9,8 \times 5 \checkmark$
 $= 0,49 \text{ J} \checkmark$

(3)

5.4

OPTION/OPSIE 1

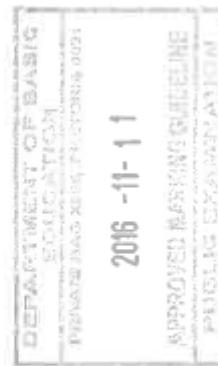
$$\begin{aligned} (E_p + E_k)_{\text{top/bro}} &= (E_p + E_k)_{\text{bottom/onder}} \quad \checkmark \\ mgh + \frac{1}{2}mv^2 &= mgh + \frac{1}{2}mv^2 \\ (0,01)(9,8)(10) + 0 \checkmark &= (0,01)(9,8)(5) + \frac{1}{2} \times 0,01 \times v^2 \quad \checkmark \\ v &= 9,89 \text{ m}\cdot\text{s}^{-1} \quad \checkmark \end{aligned}$$

OPTION/OPSIE 2

$$\begin{aligned} (E_p + E_k)_{\text{top/bro}} &= (E_p + E_k)_{\text{bottom/onder}} \quad \checkmark \\ mgh + \frac{1}{2}mv^2 &= mgh + \frac{1}{2}mv^2 \\ (0,01)(9,8)(10) + 0 \checkmark &= 0,49 + \frac{1}{2} \times 0,01 \times v^2 \quad \checkmark \\ v &= 9,89 \text{ m}\cdot\text{s}^{-1} \quad \checkmark \end{aligned}$$

ACCEPT/AANVAAR:

$(E_p + E_k)_i = (E_p + E_k)_f$



(4)

- 5.5 Equal to \checkmark . Mechanical energy is conserved \checkmark , it is a closed system. \checkmark

Gelyk aan. Meganiese energie word behou, dit is 'n geslote stelsel.

(3)

[14]

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1.4 D ✓✓

(2)

QUESTION 5/VRAAG 5

5.1 The total mechanical energy in an isolated system is constant. ✓✓
Die totale meganiese energie in 'n geïsoleerde sisteem is konstant.

(2)

5.2.1 250 J✓✓

(2)

5.2.2
$$\left. \begin{array}{l} (E_M)_A = (E_M)_C \\ (E_{K1} + E_{P1})_A = (E_{K2} + E_{P2})_C \\ (E_M)_A = (E_K + E_P)_C \\ \left(\frac{1}{2}mv^2 + mgh \right)_A = \left(\frac{1}{2}mv^2 + mgh \right)_C \\ 250\checkmark = \frac{1}{2}(5)v^2 \checkmark + (5)(9,8)(5) \checkmark \\ v = 1,41 \text{ m}\cdot\text{s}^{-1}\checkmark \end{array} \right\}$$

Any one/Enige een✓

(5)

5.3 Mechanical energy at point D = $\frac{1}{2}mv^2 + mgh$
Meganiese energie by punt D = $0 + (5)(9,8)(7) \checkmark$
 $= 343 \text{ J}$

OR/OF

Just before it goes over point D, it is momentarily stationary.

Net voordat dit oor punt D gaan, staan dit vir 'n oomblik stil

Mechanical energy/Meganiese energie = $E_p = mgh = (5)(9,8)(7)\checkmark = 343 \text{ J}$

The minimum energy needed for the steel ball to reach the point D 343 J✓
The mechanical energy of the steel ball is 250 J which is less than that at D✓
So the ball cannot reach the point D. ✓

Die minimum energie benodig vir die staalbal om punt D te bereik is 343 J
Die meganiese energie van die staalbal is 250 J wat minder is as dit by punt D. So die bal kan nie punt D bereik nie

(4)
[13]