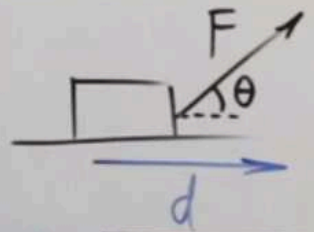
TRABAJO MECÁNICO: (W)

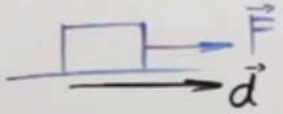
- MAGNITUD ESCALAR
- MIDE EL DESPLAZAMIENTO GENERADO POR LA FUERZA.
- PUEDE SER POSITIVO(+) O NEGATIVO(−) O NULO.



$$W^F = F \cdot d \cdot \cos\theta$$

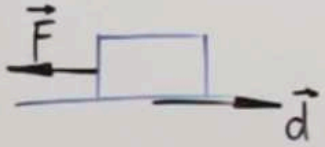
CASOS:

1) $\theta = 0°$



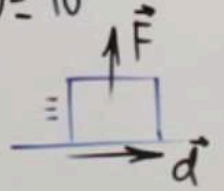
$$W^F = +F \cdot d$$

2) $\theta = 180°$

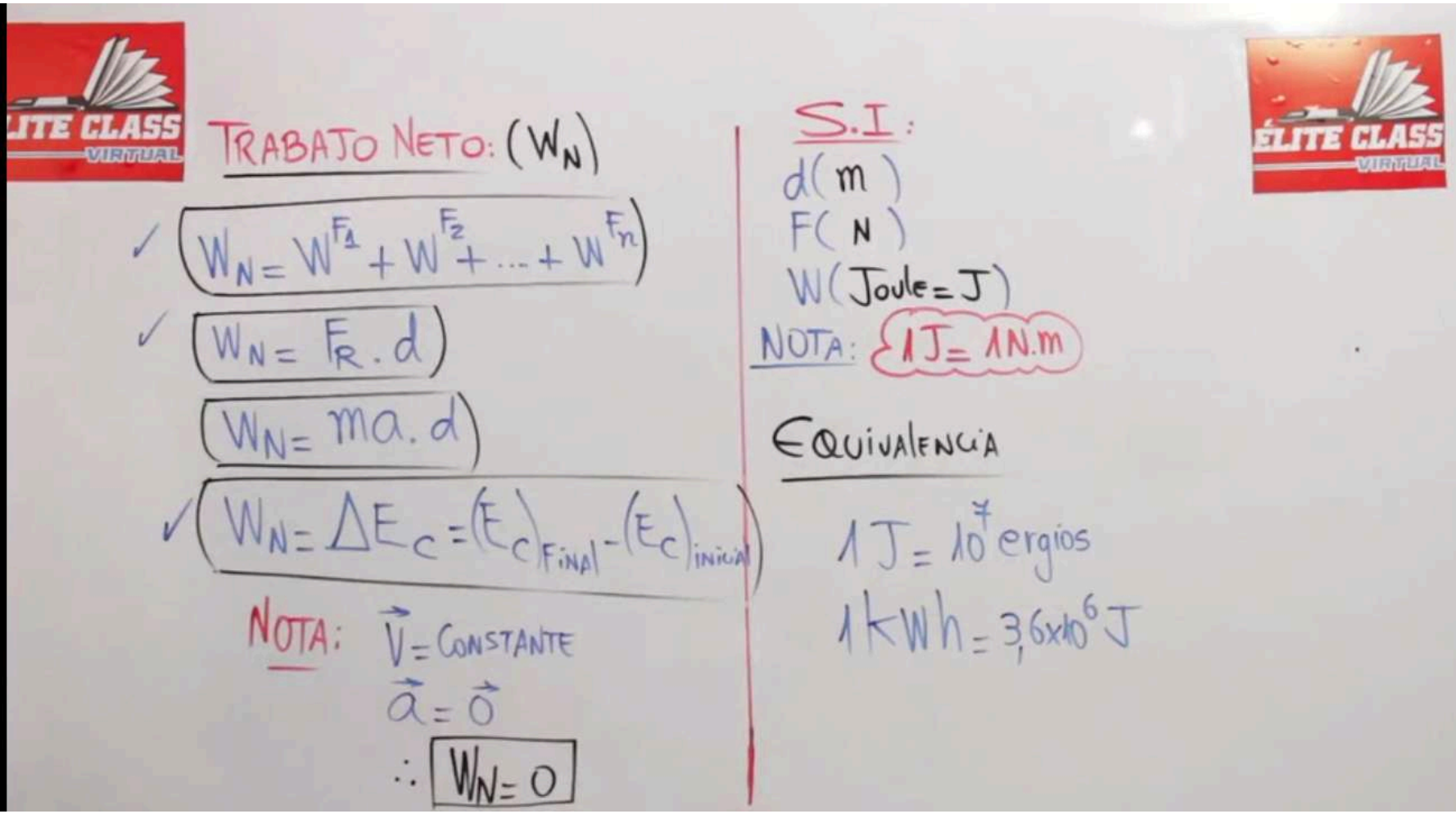


$$W^F = -F \cdot d$$

3) $\theta = 90°$



$$W^F = 0$$


ÉLITE CLASS VIRTUAL
TRABAJO NETO: (W_N)
$W_N = W^{F_1} + W^{F_2} + \dots + W^{F_n}$
$W_N = F_R \cdot d$
$W_N = ma \cdot d$
$W_N = \Delta E_c = (E_c)_{FINAL} - (E_c)_{INICIAL}$
NOTA: $\vec{V}$ = CONSTANTE
$\vec{a} = \vec{0}$
$\therefore W_N = 0$
S.I:
d(m)
F(N)
W(Joule = J)
NOTA: 1J = 1N.m
EQUIVALENCIA
$1\,J = 10^7$ ergios
$1\,kWh = 3{,}6 \times 10^6\,J$
ÉLITE CLASS VIRTUAL

POTENCIA MECÁNICA: (P)

- ✓ MAGNITUD ESCALAR
- ✓ MIDE LA RAPIDEZ PARA DESARROLLAR TRABAJO.
- ✓ S.I: P(Watt = W)

NOTA: 1 Watt = 1 Vatio

1) POTENCIA MEDIA (P_m)

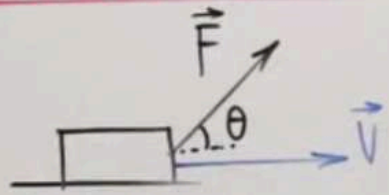
$$P_m = \frac{W^F}{t}$$

W^F: TRABAJO DE LA FUERZA (J)

t: TIEMPO (s)

NOTA: $1\ Watt = 1\ \frac{J}{s}$

2) POT. INSTANTÁNEA: (P_i)



$$P_i = F.V.\cos\theta$$

EQUIVALENCIAS: 1 HP = 746 W

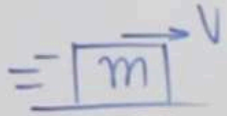
1 C.V = 735 W

ENERGÍA (E)

- MAGNITUD ESCALAR.
- MIDE LA CAPACIDAD PARA DESARROLLAR TRABAJO.
- PUEDE SER POSITIVA (+), NEGATIVA (−) o NULO (0).
- S.I: E (JOULE = J)

1) E. CINÉTICA (E_c)

- E. DEL MOVIMIENTO.
- DEPENDE DEL SISTEMA DE REFERENCIA.
- SIEMPRE ES POSITIVA.



$$E_c = \frac{1}{2} m \cdot V^2$$

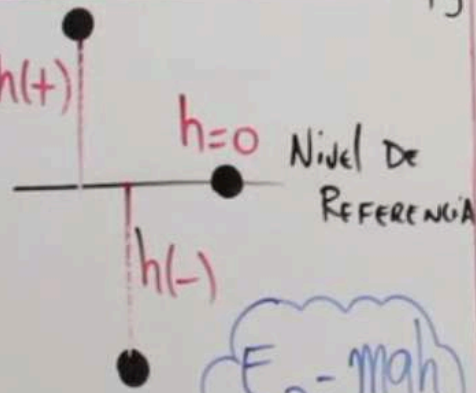
m: MASA (kg)

V: VELOCIDAD (m/s)

2) ENERGÍA POTENCIAL: (E_p)

- ENERGÍA DE INTERACCIÓN (DEBIDO A LOS CAMPOS ELÉCTRICOS, GRAVITATORIOS, MAGNÉTICOS, ...)

2.1) E.P. GRAVITATORIA (E_{pg})



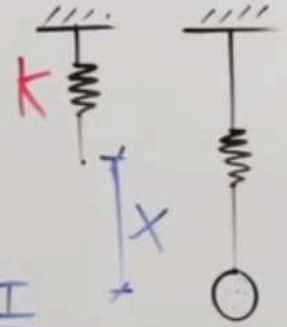
$$E_{pg} = mgh$$

m: MASA (kg)

$g = 9{,}8\ m/s^2$

h = ALTURA (m)

2.2) E.P. ELÁSTICA (E_{pE})



$$E_{pE} = \frac{1}{2}kx^2$$

S.I

k: CONSTANTE ELÁSTICA o RIGIDEZ $\left(\frac{N}{m}\right)$

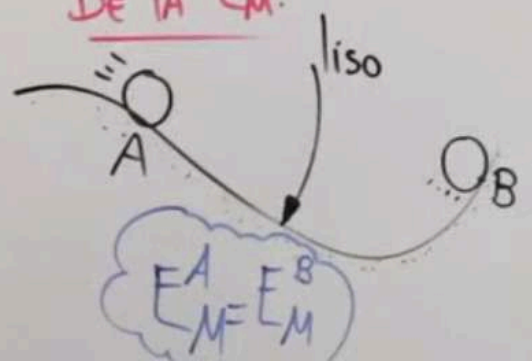
x: DEFORMACIÓN (m)

3) Energía Mecánica (E_M)

$$E_M = E_c + E_p$$

$$E_M = \frac{1}{2}mv^2 + mgh + \frac{1}{2}kx^2$$

Principio de la Conservación de la E_M.



Teorema del Trabajo de las Fuerzas No Conservativas y ΔE_M

$$W_{F.N.C} = \Delta E_M$$

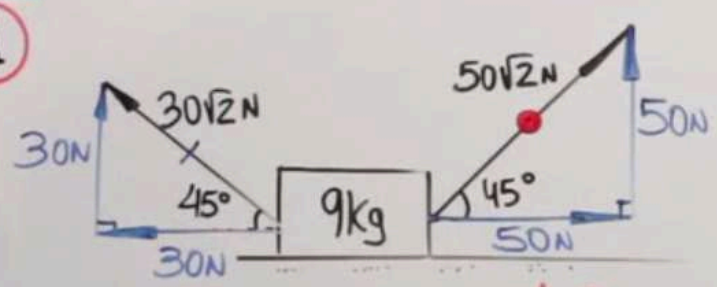
Nota: Si la F.N.C = Fuerza de Rozamiento

$$\therefore W_{roz} = \Delta E_M$$

Recordar: $W_{roz} = -f_{roz} \cdot d$

ÉLITE CLASS VIRTUAL

1



→ d=20m

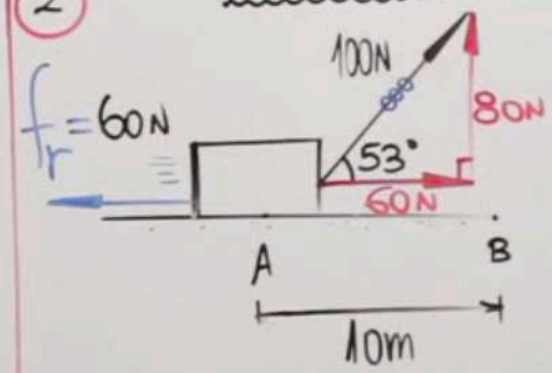
✓ $F_R = 50N - 30N = 20N$

✓ $W_N = F_R . d = (20)(20) = 400J$ ✳

2

V=CONST.

EQUILIBRIO



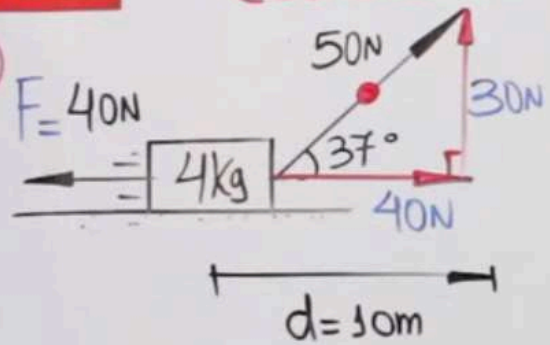
$W_{roz} = -f_r . d = -60(10)$

$= -600J$ ✳

ÉLITE CLASS VIRTUAL

movimiento
EQUILIBRIO CINÉTICO

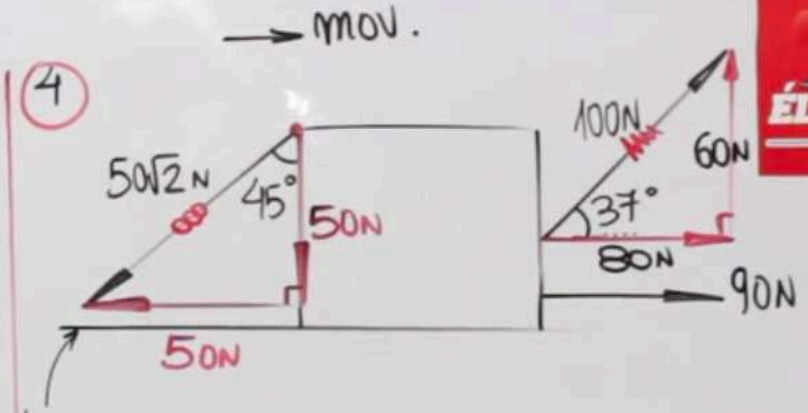
③



$W^F = -F.d = -40(10)$

$\boxed{W^F = -400J}$

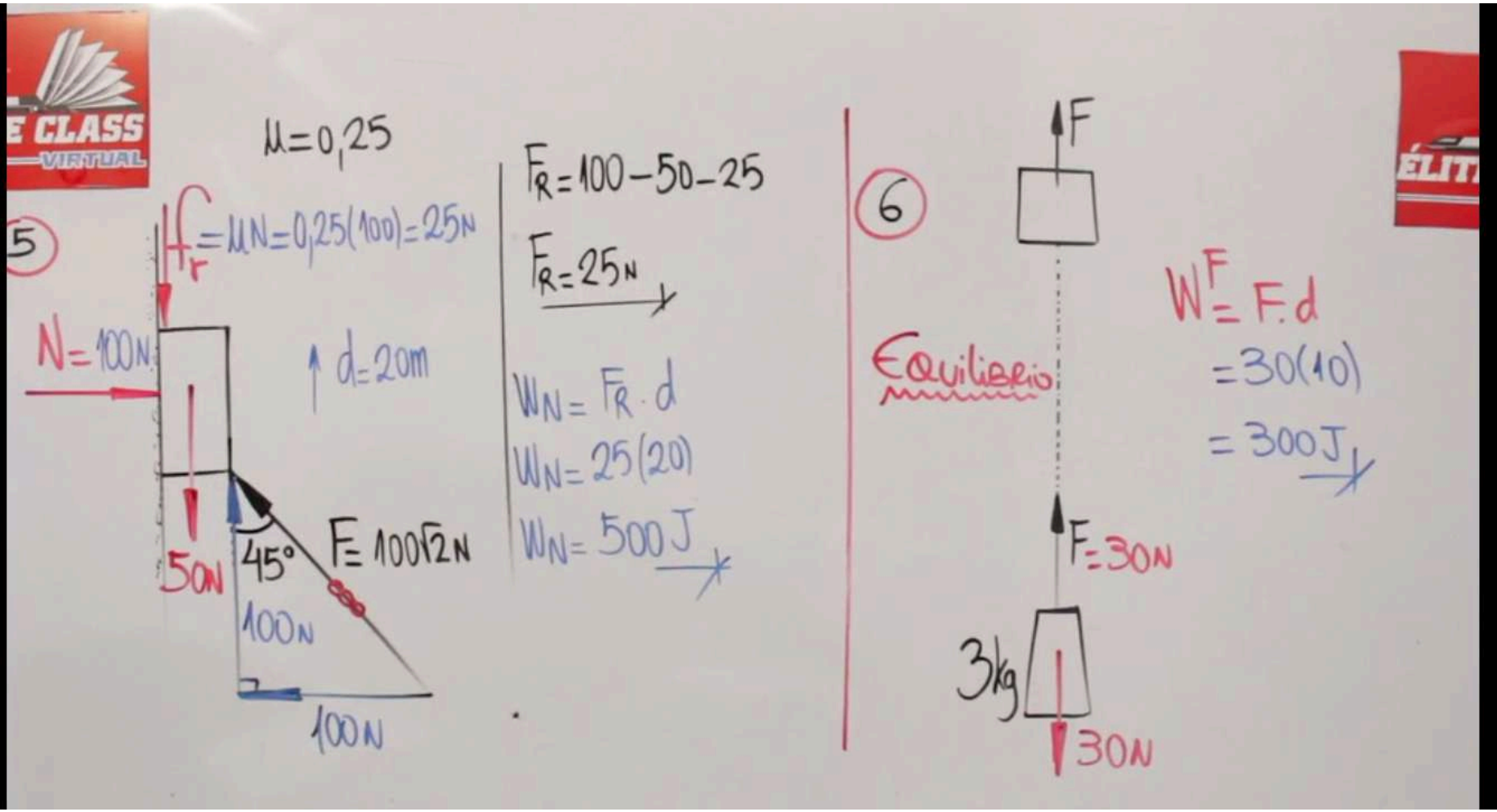
④



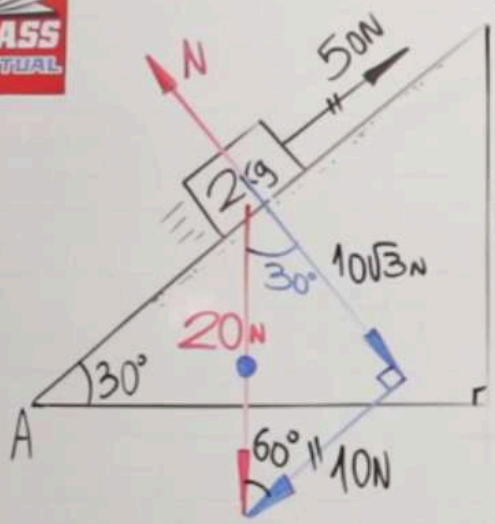
$F_R = 80N + 90N - 50N = 120N$

$W_N = F_R.d = 120(5)$

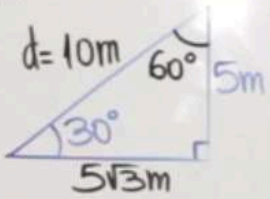
$\boxed{W_N = 600J}$


μ=0,25
5
$f_r = \mu N = 0{,}25(100) = 25N$
N=100N
d=20m
50N
45°
F=100√2N
100N
100N
$F_R = 100 - 50 - 25$
$F_R = 25N$
$W_N = F_R \cdot d$
$W_N = 25(20)$
$W_N = 500J$
6
F
Equilibrio
F=30N
3kg
30N
$W^F = F.d$
$= 30(10)$
$= 300J$

(7)



*)



*) $F_R = 50 - 10$

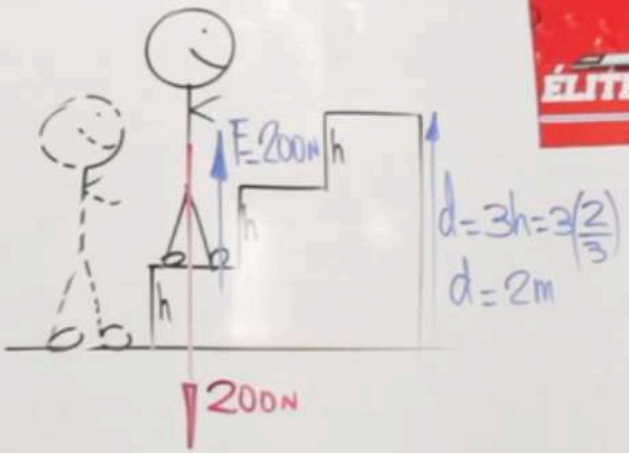
$F_R = 40N$

*) $W_N = F_R . d$

$= 40(10)$

$= 400J$

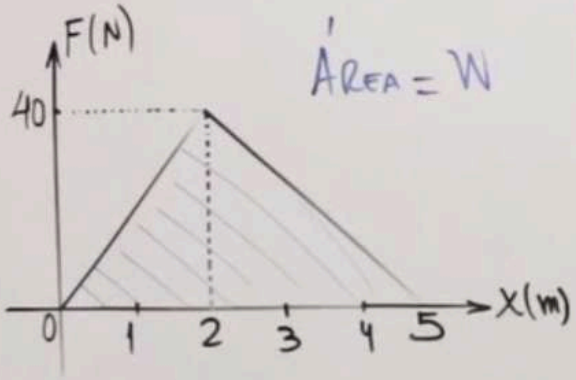
(8)



$W^F = F.d = 200(2) = 400J$

ÉLITE CLASS VIRTUAL

(9)



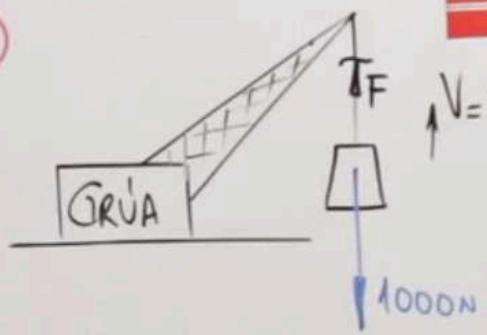
ÁREA = W

$\therefore W = \frac{b \times h}{2} = \frac{5 \times 40}{2}$

$W = 100J$

(10)

$m = 100kg$



$V = 3{,}8 \frac{m}{s}$

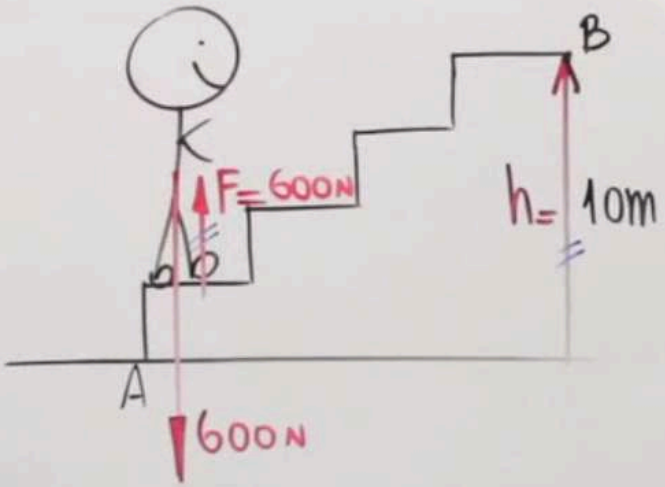
✓ $F = 1000N$

✓ $P = F.V = 1000(3{,}8)$

$P = 3800W$

ITE CLASS VIRTUAL

11



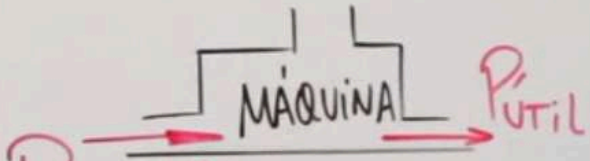
$$P = \frac{W^F}{t} = \frac{F.d}{t} = \frac{600(10)}{20}$$

$$P = 300W$$

12

$\eta = 75\%$

ÉLITE CLAS VIRTU



$$\eta = \frac{P_U}{P_E} \times 100\% \rightarrow$$

$$75\% = \frac{P_U}{6kw} \cdot 100\% \rightarrow P_U = 4{,}5kw$$

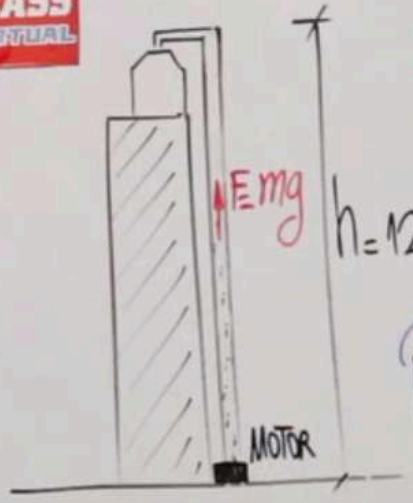
ÉLITE CLASS VIRTUAL

13

1 l de Agua <> 1kg

Vol = 6m³ = 6000 l

m = 6000 kg

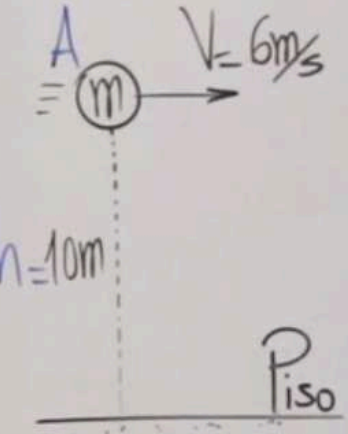


$P = \frac{W^F}{t} = \frac{F.d}{t} = \frac{mgh}{t}$

$P = \frac{6000(10)(12)}{3600} = 200W$

1h = 3600s

16

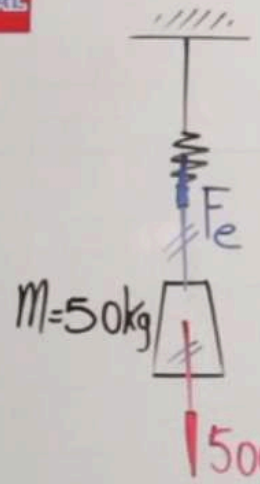


$E_M = \frac{1}{2}mv^2 + mgh$

$E_M = \frac{1}{2}(2).6^2 + 2(9,8)(10)$

$E_M = 36 + 196 = 232J$

17



*) $F_e = 500N$

$kx = 500$

$500x = 500$

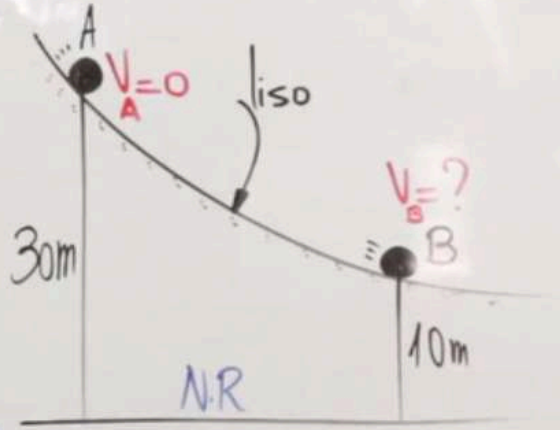
$\boxed{x = 1m}$

*) $E_{pE} = \frac{1}{2}kx^2$

$= \frac{1}{2} \cdot 500(1)^2$

$E_{pE} = 250J$

18



$E_M^A = E_M^B$

$(mgh)_A = (\frac{1}{2}mV^2 + mgh)_B$

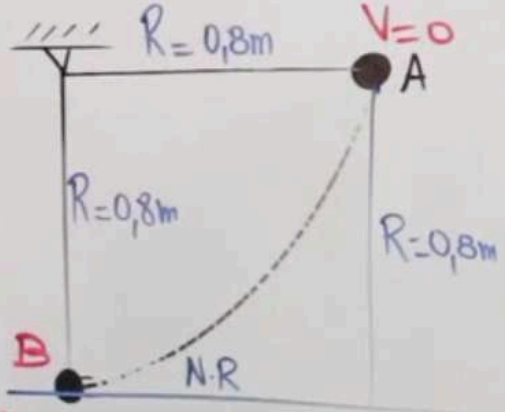
$10(30) = \frac{1}{2}V_B^2 + 10(10)$

$200 = \frac{1}{2}V_B^2$

$V_B = 20m/s$

ÉLITE CLASS VIRTUAL

19



$E_M^A = E_M^B$

$(mgh)_A = \left(\frac{1}{2}mv^2\right)_B$

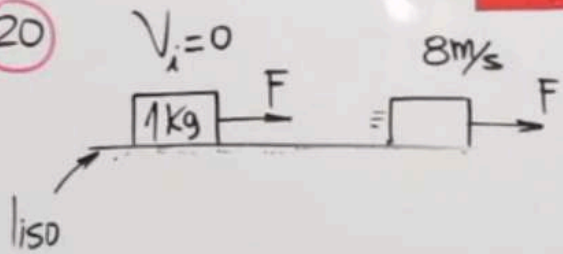
$10(0,8) = \frac{1}{2}V_B^2$

$V_B = 4\,m/s$

$E_C = \frac{1}{2}mv^2$

ÉLITE CLASS VIRTUAL

20



$W_N = \Delta E_C$

$W^F = (E_C)_{FINAL} - (E_C)_{INICIAL}$

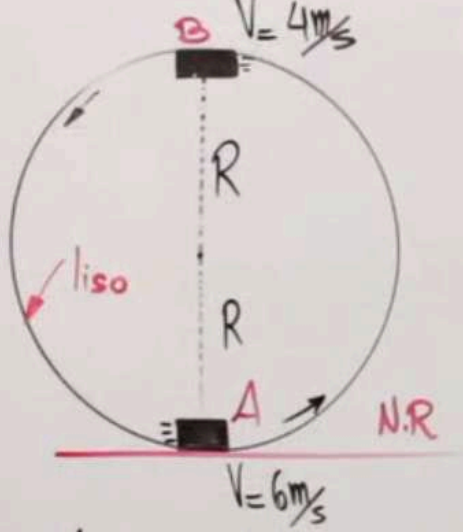
$W^F = \frac{1}{2}.1.(8)^2 - \frac{1}{2}.1.(0)^2$

$W^F = 32\,J$

$E_M^A = E_M^B$

$\left(\frac{1}{2}mv^2\right)_A = \left(\frac{1}{2}mv^2 + mgh\right)_B$

38



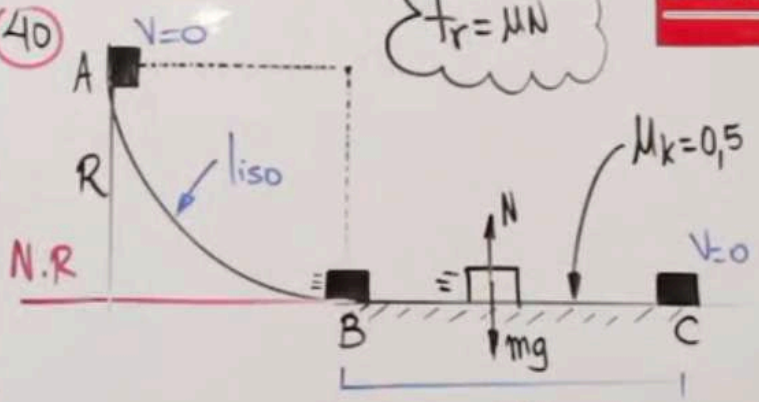
$\frac{1}{2}.36 = \frac{1}{2}.16 + 10(2R)$

$10 = 20R \rightarrow R = 0,5m$

$E_M^A = E_M^B$

$f_r = \mu N$

40



$\overline{BC}$: $W_{roz} = \Delta E_M$

$-f_r.d = E_M^C - E_M^B$

$\mu.mg.d = mgR$

$0,5d = 10$

$d = 20m$