③ $R_1 = 25652$, $R_2 = 1.52$, $N - ?$

$R_1 = N \cdot R_0$

$R_2 = \frac{R_0}{N}$

$\frac{R_1}{R_2} = \frac{N \cdot R_0}{\frac{R_0}{N}} = N^2$, $N = \sqrt{\frac{R_1}{R_2}} = 16$ 4p

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CMF, Soluții, clasa a X-a, 2017

① $v_0 = 10 \frac{m}{s}$, $\alpha = 45^0$, $l = 4m$, $g = 10 \frac{m}{s^2}$, $\tau - ?$

$l = v_0 (t - \tau) \cos\alpha$ (1) 1p

$y_B = v_0 (t - \tau) \sin\alpha - \frac{g(t-\tau)^2}{2}$ (2) 1p

$y_A = v_0 t - \frac{gt^2}{2}$ (3) 1p

$\tau = t - \frac{l}{v_0 \cos\alpha}$ (4) 1p (3) → (4) → (2)

$v_0 t - \frac{gt^2}{2} = v_0 (t - t + \tau) \sin\alpha - \frac{g}{2} \left(t - t + \frac{l}{v_0 \cos\alpha}\right)^2$ 1p

$\frac{gt^2}{2} - v_0 t + l \left(tg\alpha - \frac{gl}{2 v_0^2 \cos^2\alpha}\right) = 0$ 3p

$5t^2 - 10t + 1,6 = 0$

$t_1 = 1,82 s$

$t_2 = 0,175 s$ falsă } 1p

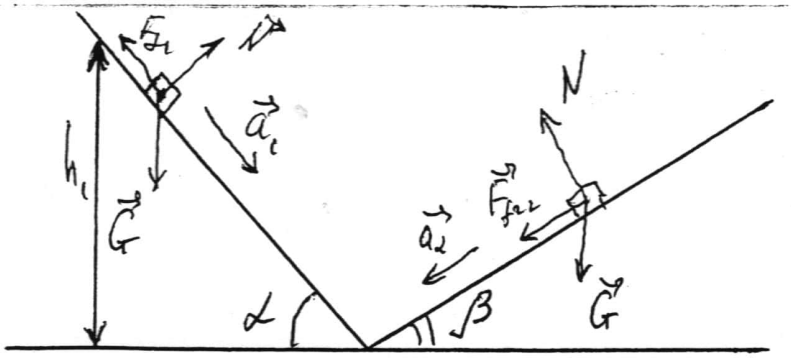
din (4) $\tau = 1,82 - 0,57 = 1,25 s$ 1p

2) $v_0 = 0$

h_1, μ_1, μ_2

$h_2 - ?$

10 puncte



$a_1 = g(\sin\alpha - \mu_1 \cos\alpha)$ (1) (2p) (1p)

$S_1 = \frac{a_1 t_1^2}{2} \Rightarrow t_1 = \sqrt{\frac{2S_1}{a_1}}$ (2) (1p) $\sin\alpha = \frac{h_1}{S_1} \Rightarrow S_1 = \frac{h_1}{\sin\alpha}$ (3) (1p)

(1) (3) $\rightarrow$ (2) $t_1 = \sqrt{\frac{2h}{g(\sin\alpha - \mu_1\cos\alpha)\sin\alpha}}$ (4) (1p)

$v_1 = a_1 t_1 = \sqrt{\frac{2h\, g(\sin\alpha - \mu_1\cos\alpha)}{\sin\alpha}}$ (5) (1p)

$S_2' = \frac{v_1^2}{2a_2}$ (6) (1p) $\sin\beta = \frac{h_2}{S_2} \Rightarrow S_2 = \frac{h_2}{\sin\beta}$ (7) (0,5p)

(7) $\rightarrow$ (6) $h_2 = \frac{v_1^2 \sin\beta}{2a_2}$ (8) (0,5p) $a_2 = g(\sin\beta + \mu_2\cos\beta)/g$ (1p)

(5), (9) $\rightarrow$ (8)

$h_2 = \frac{h_1(1 - \mu_1 \operatorname{ctg}\alpha)}{1 + \mu_2 \operatorname{ctg}\beta}$ (10) (2p)

⑤ $F = 0{,}12\,м$
$a = 0{,}179\,м$
$b = 0{,}181\,м$

$\Gamma - ?$

$$\Gamma = \frac{f_1 - f_2}{b - a} \quad (1)$$ 1р

$$\frac{1}{F} = \frac{1}{a} + \frac{1}{f_1}$$ 1р

$$f_1 = \frac{F \cdot a}{a - F} = 0{,}364\,м$$ 1р

$$f_2 = \frac{Fb}{b - F} = 0{,}341\,м$$ 0,5р

$$\Gamma = \frac{0{,}364\,м - 0{,}341\,м}{0{,}181 - 0{,}179} = 4$$ 0,5р

3р

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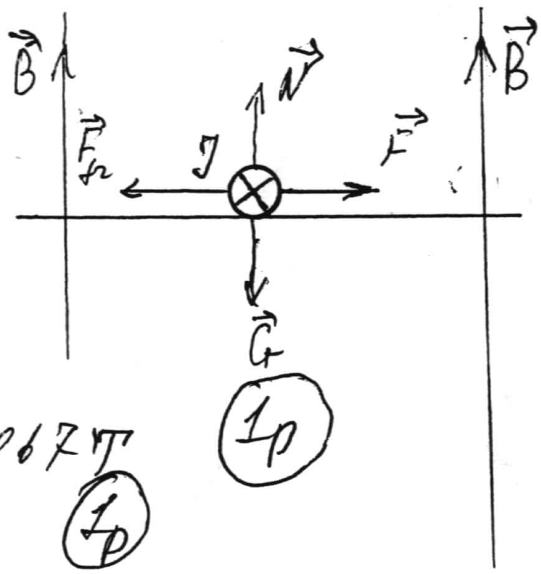
④ $l = 0{,}3\,м$
$J = 50\,А$
$\mu = 0{,}2$
$m = 0{,}5\,кг$

$B - ?$

$$F = F_{A2}$$ 1р

$$JBl = \mu mg$$ 1р

$$B = \frac{\mu mg}{Jl} \approx 0{,}017\,Т$$ 1р



1р

3р