SILA OTPORA SREDINE

OBRASCI ZA RAD ZADATAKA

$$F_R = m \cdot a$$

$$F_t = m \cdot g$$

UBRZANO

$$F_R = F_t - F_{ot}$$

$$F_{ot} = F_t - F_R$$

USPORENO

$$F_{ot} = F_R$$

$$F_{ot} = m \cdot a$$

RAVNOMERNO

$$F_{ot} = F_t$$

$$F_{ot} = m \cdot g$$

SILA OTPORA SREDINE

1. Prilikom otvaranja padobrana brzina padobranca se smanji sa $65 \frac{m}{s}$ na $5 \frac{m}{s}$ za 1,2s. Koliko je ubrzanje padobranca? Kolika sila opora vazduha koči padobranca mase 100 kg?

$$v_0 = 65 \frac{m}{s}$$

$$v = 5 \frac{m}{s}$$

$$t = 1,2 \text{ s}$$

$$m = 100 \text{kg}$$

$$a = ?$$

$$F_{ot} = ?$$

$$a = \frac{\Delta v}{t} = \frac{v_0 - v}{t} = \frac{65 \frac{m}{s} - 5 \frac{m}{s}}{1,2s} = \frac{60 \frac{m}{s}}{1,2s} = 50 \frac{m}{s^2}$$

$$F_{ot} = m \cdot a$$

$$F_{ot} = 100 \ kg \cdot 50 \frac{m}{s^2}$$

$$F_{ot} = 5000N$$

USPORENO

$$F_{ot} = F_R$$

$$F_{ot} = m \cdot a$$

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2. Lopta mase $0,3 \, kg$ gurnuta je brzimom $2,5 \frac{m}{s}$ u sprotnom smeru od smera duvanja jakog vetra. Kolika je sila otpora vazduha ako se lopta zautavi nakon pređenih $10 \, m$. Zanemariti trenje kotrljanja lopte.

$$v_0 = 2,5 \frac{m}{s}$$

$$S = 10m$$

$$v = 0 \frac{m}{s}$$

$$m = 0,3kg$$

$$v^2 = v_0^2 - 2aS$$

$$2aS = v_0^2 - v^2$$

$$a = \frac{v_0^2 - v^2}{2S}$$

$$a = \frac{\left(2,5 \frac{m}{s}\right)^2 - \left(0 \frac{m}{s}\right)^2}{2 \cdot 10m}$$

$$a = \frac{6,25 \frac{m^2}{s^2}}{20 \, m}$$

$$a = 0,3125 \frac{m}{s^2}$$

$$F_{ot} = m \cdot a$$

$$F_{ot} = 0,3kg \cdot 0,3125 \frac{m}{s^2}$$

$$F_{ot} = 0.09375 \text{N}$$

USPORENO

$$F_{ot} = F_R$$

$$F_{ot} = m \cdot a$$

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3. Kamen mase 2,5 kg pada ubrzanjem $7\frac{m}{s^2}$. Kolika je sila otpora sredine?

$m = 2,5 kg$
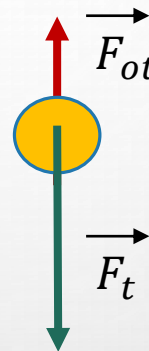
$a = 7\dfrac{m}{s^2}$

$F_{ot} = ?$

$F_R = m \cdot a$

$F_R = 2,5 kg \cdot 7\dfrac{m}{s^2}$

$F_R = 17,5 N$

$F_t = m \cdot g$

$F_t = 2,5 kg \cdot 10\dfrac{m}{s^2}$

$F_t = 25\ N$

$\overrightarrow{F_{ot}}$

$\overrightarrow{F_t}$

$F_R = F_t - F_{ot}$

$F_{ot} = F_t - F_R$

$F_{ot} = 25N - 17,5N$

$F_{ot} = 2,5N$

UBRZANO

$F_R = F_t - F_{ot}$

$F_{ot} = F_t - F_R$

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4. Dok padaju vertikalno i ravnomerno, na padobranca i padobran deluje otpor sredine. Kolika je sila otpro sredine ako je masa padobranca i padobrana 90 kg?

$m = 90 \text{ kg}$

$F_{ot} = ?$

$F_{ot} = F_t$ $F_t = m \cdot g$

$F_{ot} = m \cdot g$

$F_{ot} = 90 \text{ kg} \cdot 10 \dfrac{m}{s^2}$

$F_{ot} = 900 \text{ N}$

RAVNOMERNO

$F_{ot} = F_t$

$F_{ot} = m \cdot g$

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5. Stefan konstantnom silom 170 N vuće čamac mase 100kg ka obali jezera. Krećući iz mirovanja čamac do obale pređe 5m za 5s. Kolikom silom voda usporava čamac?

$F = 170 \, N$

$m = 100 \, kg$

$v_0 = 0 \dfrac{m}{s}$

$S = 5 \, m$

$t = 5 \, s$

$F_{ot} = ?$

$S = \dfrac{a \cdot t^2}{2}$

$a = \dfrac{2 \cdot S}{t^2}$

$a = \dfrac{2 \cdot 5m}{25 \, s^2}$

$a = 0{,}4 \dfrac{m}{s^2}$

$F_R = m \cdot a$

$F_R = 100kg \cdot 0{,}4 \dfrac{m}{s^2}$

$F_R = 40N$

$F_R = F - F_{ot}$

$F_{ot} = F - F_R$

$F_{ot} = 170N - 40N$

$F_{ot} = 130N$

UBRZANO

$F_R = F_t - F_{ot}$

$F_{ot} = F_t - F_R$