

Attività MUI

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29) $r = 7 \text{ m}$ $T? f? a_n? p?$
 150 rpm
 $t = 10 \text{ s}$ $\omega = 150 \text{ rpm} \cdot \frac{2\pi \text{ rad}}{1 \text{ rev}} \cdot \frac{1 \text{ min}}{60 \text{ s}} = 5\pi \text{ rad/s}$
 $\omega = \frac{2\pi}{T}$; $T = \frac{2\pi}{\omega} = \frac{2\pi}{5\pi} = [0,4 \text{ s}]$
 $f = \frac{1}{T} = \frac{1}{0,4} = [2,5 \text{ Hz}]$
 $a_n = \frac{v^2}{r} = \omega^2 \cdot r = (5\pi)^2 \cdot 7 = [1725,63 \text{ m/s}^2]$
 $p = p_0 + \omega t = 0 + 5\pi \cdot 10 = [157 \text{ rad}]$

30) $v = \frac{100 \text{ km}}{h} \cdot \frac{10^3 \text{ m}}{1 \text{ km}} \cdot \frac{1 \text{ h}}{3600 \text{ s}} = 27,78 \text{ m/s}$
 $r = 40 \text{ cm} \cdot \frac{1 \text{ m}}{10^2 \text{ cm}} = 0,4 \text{ m}$
 $s = 1000 \text{ m}$
 $v = \omega \cdot r$; $\omega = \frac{v}{r} = \frac{27,78 \text{ m/s}}{0,4 \text{ m}} = [69,44 \text{ rad/s}]$
 $s = \varphi \cdot r$; $\varphi = \frac{s}{r} = \frac{1000 \text{ m}}{0,4 \text{ m}} = 2500 \text{ rad}$
 $2500 \text{ rad} \cdot \frac{1 \text{ rev}}{2\pi \text{ rad}} = [397,89 \text{ voltes}]$

31) $\omega = 33 \text{ rpm} \cdot \frac{2\pi \text{ rad}}{1 \text{ rev}} \cdot \frac{1 \text{ min}}{60 \text{ s}} = [3,46 \text{ rad/s}]$
 $r = 15 \text{ cm} \cdot \frac{1 \text{ m}}{10^2 \text{ cm}} = 0,15 \text{ m}$
 $v = \omega \cdot r = 3,46 \text{ rad/s} \cdot 0,15 \text{ m} = [0,52 \text{ m/s}]$
 $T = \frac{2\pi}{\omega}$; $T = \frac{2\pi}{3,46} = [1,82 \text{ s}]$
 $f = \frac{1}{T} = \frac{1}{1,82} = [0,55 \text{ Hz}]$
 $t = 5 \text{ min} \cdot \frac{60 \text{ s}}{1 \text{ min}} = 300 \text{ s}$
 $\varphi = \varphi_0 + \omega t = 3,46 \text{ rad/s} \cdot 300 \text{ s} = [1036,72 \text{ rad}]$

33) $d = 30 \text{ cm} \cdot \frac{1 \text{ m}}{10^2 \text{ cm}} = 0,3 \text{ m}$ $\varphi = \pi t$

a) $r = \frac{d}{2} = 0,15 \text{ m}$ $\omega = \pi \text{ rad/s}$
 $v = \omega \cdot r = \pi \cdot 0,15 = [0,47 \text{ m/s}]$

b) $t = 1 \text{ h} \cdot \frac{3600 \text{ s}}{1 \text{ h}} = 3600 \text{ s}$
 $3600 \text{ s} \cdot \frac{\pi \text{ rad}}{\text{s}} \cdot \frac{1 \text{ rev}}{2\pi \text{ rad}} = [1800 \text{ voltes}]$

34) $t = 15 \text{ s}$ $\omega? \text{ p?} a_n?$
 $v = \frac{60 \text{ km}}{h} \cdot \frac{10^3 \text{ m}}{1 \text{ km}} \cdot \frac{1 \text{ h}}{3600 \text{ s}} = 16,67 \text{ m/s}$
 $\omega = \frac{\Delta \varphi}{\Delta t} = \frac{2\pi}{T} = \frac{2\pi}{15} = [0,42 \text{ rad/s}]$
 $r = \frac{v}{\omega} = \frac{16,67 \text{ m/s}}{0,42 \text{ rad/s}} = 39,79 \text{ m}$
 $s = \varphi \cdot r = 2\pi \cdot 39,79 = [250 \text{ m}]$
 $a_n = \frac{v^2}{r} = \frac{(16,67)^2 \text{ m/s}^2}{39,79 \text{ m}} = [7 \text{ m/s}^2]$

35) $v = \frac{12 \text{ km}}{h} \cdot \frac{10^3 \text{ m}}{1 \text{ km}} \cdot \frac{1 \text{ h}}{3600 \text{ s}} = 3,33 \text{ m/s}$

$r = 30 \text{ cm} \cdot \frac{1 \text{ m}}{10^2 \text{ cm}} = 0,3 \text{ m}$

a) $v = \omega \cdot r$; $\omega = \frac{v}{r} = \frac{3,33 \text{ m/s}}{0,3 \text{ m}} = [11,1 \text{ rad/s}]$

b) $s = s_0 + v \cdot t$; $t = 10 \text{ min} \cdot \frac{60 \text{ s}}{1 \text{ min}} = 600 \text{ s}$
 $s = 3,33 \cdot 600 = [2000 \text{ m}]$

c) $600 \text{ s} \cdot \frac{11,1 \text{ rad}}{\text{s}} \cdot \frac{1 \text{ rev}}{2\pi \text{ rad}} = [1061 \text{ voltes}]$

36) $a_n = \frac{v^2}{r} = \frac{(50)^2}{50} = [50 \text{ m/s}^2]$

$r = 50 \text{ m}$

$v = \frac{180 \text{ km}}{h} \cdot \frac{10^3 \text{ m}}{1 \text{ km}} \cdot \frac{1 \text{ h}}{3600 \text{ s}} = 50 \text{ m/s}$

37) $r = 50 \text{ m}$

5 rev
 $t = 2 \text{ min} ; 37 \text{ s}$ $2 \text{ min} \cdot \frac{60 \text{ s}}{1 \text{ min}} = 120 \text{ s}$
 $t = 120 + 37 = 157 \text{ s}$

$\omega = \frac{5 \text{ rev}}{157 \text{ s}} \cdot \frac{2\pi \text{ rad}}{1 \text{ rev}} = [0,20 \text{ rad/s}]$

b) $v = \omega \cdot r = 0,20 \text{ rad/s} \cdot 50 \text{ m} = 10 \text{ m/s}$

c) $a_n = \frac{v^2}{r} = \frac{10^2}{50} = [2 \text{ m/s}^2]$