HW #1

p 311 Problem 4, 5, 6
p 316 Reading 81, 82, 83, 84
Online - Marching Band

(8)

p311 - Problems

4) $\omega_o = 1200$ rpm
$\omega_f = 3000$ rpm
$t = 3.0$ s
$\alpha = ?$

(1)

① $\frac{1200 \text{ rev}}{\text{min}} \left(\frac{2\pi \text{ rad}}{1 \text{ rev}}\right)\left(\frac{1 \text{ min}}{60 \text{ sec}}\right) = 130 \text{ rad/s}$

② $\frac{3000 \text{ rev}}{\text{min}} \left(\frac{2\pi \text{ rad}}{1 \text{ rev}}\right)\left(\frac{1 \text{ min}}{60 \text{ s}}\right) = 310 \text{ rad/s}$

③ $\alpha = \frac{\omega_f - \omega_o}{t} = \frac{310 \text{ rad/s} - 130 \text{ rad/s}}{3.0 \text{ s}} = 60 \text{ rad/s}^2$

5) $\omega_o = 2400$ rpm
$\alpha = -30 \text{ rad/s}^2$
$\omega_f = 0$ rad/s
$t = ?$

(1)

① $\frac{2400 \text{ rev}}{\text{min}} \left(\frac{2\pi \text{ rad}}{1 \text{ rev}}\right)\left(\frac{1 \text{ min}}{60 \text{ s}}\right) = 250 \text{ rad/s}$

② $t = \frac{\omega_f - \omega_o}{\alpha} = \frac{-(250 \text{ rad/s})}{-30 \text{ rad/s}^2} = 8.3 \text{ s}$

6) $\alpha = 190 \text{ rad/s}^2$
$\omega_o = 0$ rad/s
$\omega_f = 1800$ rpm
$t = ?$

(1)

① $\frac{1800 \text{ rev}}{\text{min}} \left(\frac{2\pi \text{ rad}}{1 \text{ rev}}\right)\left(\frac{1 \text{ min}}{60 \text{ s}}\right) = 190 \text{ rad/s}$

② $t = \frac{\omega_f - \omega_o}{\alpha} = \frac{190 \text{ rad/s}}{190 \text{ rad/s}^2} = 1 \text{ s}$

p316 - Reading

81) produce electricity when?

(c) water moving in either direction

82) water turbines more promising?

(4)

(a) less expensive
(b) less impact on environment
(c) more possible locations
(d) operate 24/7
(e) All of above

83) water turbine advantage over air?

(b) energy density of water is greater than air

84) correct statement?

(e) none are correct

- Online - Marching Band

- marching band - rows of musicians
- Alf + Beth → Beth is four times from inside

a)

Beth travels s during Δt so how far Alf travels?

(1) $S = \theta r$ $\quad$ $Alf = \frac{1}{4}s$

b) Alf speed v, Beth speed?

$v = \frac{2\pi r}{T}$ $\quad$ $Beth = 4v$