Answer on Question #41440, Physics, Mechanics | Kinametics | Dynamics

Question:

A pulley is rotating at the rate of 32 rev/min. A motor speeds up the wheel so that 30 s later it is turning at 82 rev/min. what is the average angular acceleration in radians per second

a. 0.17

b. 2.11

c. 0.32

d. 1.41

Answer:

The angular acceleration can be defined as:

$$\alpha = \frac{\Delta\omega}{\Delta t}$$

where t is time, ω is angular speed.

Angular speed equals (one revolution is equal to 2π radians):

$$\omega = 2\pi f$$

where f is number of revolution per second (minute)

Therefore:

$$\alpha = \frac{2\pi(82-32)\frac{1}{min}}{30\ s} = \frac{\frac{50}{60}\left(\frac{1}{s}\right)}{30s} = 0.17\frac{1}{s^2}$$

Answer: $0.17\frac{1}{s^2}$