Question:

A machine part at an angular of 0.060 rad/s its speed is then increased 2.2 rad/s at an angular acceleration of 0.70 rad/s.

(a) Find the angle through which the part rotates before reaching this speed.

(b) If both the initial and final angular speeds are double and the angular acceleration remains the same, by what factor is the angular displacement charged? Why?

Answer:

a) the angle through which the part rotates equals (formula for angular motion with uniform acceleration):

$$\varphi_1 = \frac{\omega_f^2 - \omega_i^2}{2\beta} = 3.5 \; rad$$

Answer: $3.5 \; rad$

b) If both the initial and final angular speeds are double:

$$\varphi_2 = \frac{2^2\omega_f^2 - 2^2\omega_i^2}{2\beta} = 4\varphi_1$$

Answer: 4