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**Include file name:** Physics\_Worksheet\_0040

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1-A disk, with a radius of  $0.23$  m, is to be rotated like a merry-go-round through  $800$  rad, starting from rest, gaining angular speed at the constant rate  $\alpha_1$  through the first  $400$  rad and then losing angular speed at the constant rate  $\alpha_1$  until it is again at rest. The magnitude of the centripetal acceleration of any portion of the disk is not to exceed  $415$  m/s<sup>2</sup>.

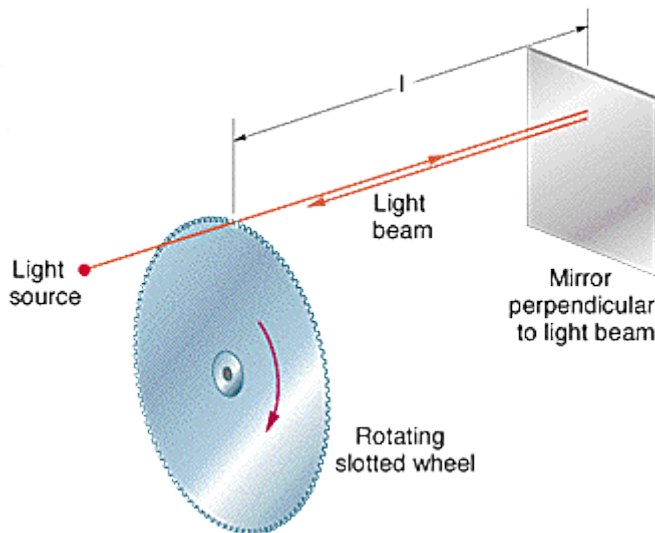
(a) What is the least time required for the rotation?

\_\_\_\_\_s

(b) What is the corresponding value of  $\alpha_1$ ?

\_\_\_\_\_rad/s<sup>2</sup>

2- An early method of measuring the speed of light makes use of a rotating slotted wheel. A beam of light passes through one of the slots at the outside edge of the wheel, travels to a distant mirror, and returns to the wheel just in time to pass through the next slot in the wheel. One such slotted wheel has a radius of  $13.0$  cm and  $1000$  slots at its edge. Measurements taken when the mirror was  $l = 500$  m from the wheel indicated a speed of light of  $3.0 \times 10^5$  km/s.



(a) What was the (constant) angular speed of the wheel?

\_\_\_\_\_rad/s

(b) What was the linear speed of a point on the edge of the wheel?

\_\_\_\_\_m/s