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Physics_Questions_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 α_1 through the first 400 rad and then losing angular speed at the constant rate α_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/s².

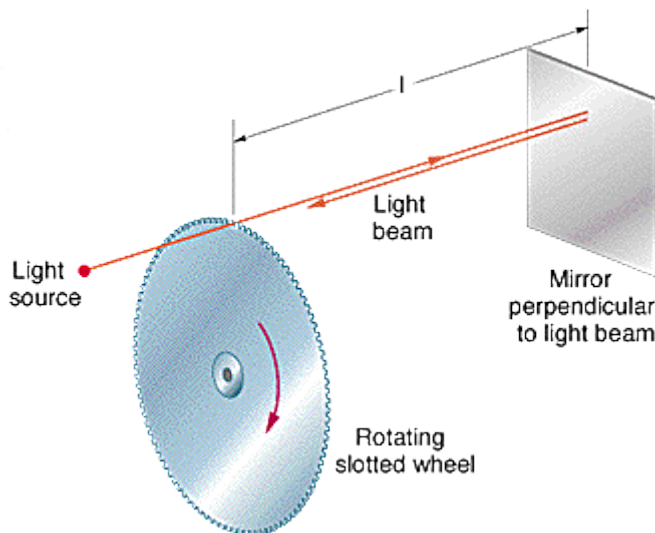
(a) What is the least time required for the rotation?

_____s

(b) What is the corresponding value of α_1 ?

_____rad/s²

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 3.0×10^5 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