

Advanced Higher Physics

Homework 1

Mechanics

Angular Motion

A cyclist jumps on his bike and starts to pedal until he reaches a steady speed. The wheels on the bike have a radius of 0.32 m

- i) If a spoke makes 3 complete revolutions in 6.0 s, calculate the angular velocity of a point on the wheel in rads^{-1} . (p)
- ii) Calculate the tangential velocity of a point on the wheel in ms^{-1} .
- iii) The cyclist pedals harder and the spoke now makes 1.5 revolutions in 1.5s. If this increase took place uniformly in 2.0 s, calculate the angular acceleration of the wheel in rads^{-2} .
- iv) Calculate the acceleration of the wheel in ms^{-2} . (use $a = r\alpha$ and verify using $a = (v-u)/t$)
- v) Calculate the angular displacement of a point on the wheel during the angular acceleration.
- iv) How far does the bike travel during the angular acceleration?