Homework H.3.F

Given: A motor rests on a platform at the top of a vertical shaft, with the shaft rotating about a fixed, vertical axis at a constant rate of ω_1. A disk of radius R is attached to the output shaft of the motor at a distance of $2R$ from the vertical shaft axis at O. The motor turns at a constant rate of ω_2. A set of xyz-coordinate axes are attached to the disk. Point P lies on the perimeter of the disk on the y-axis. At the position shown, the y-axis is aligned with the vertical shaft axis.

Find: For the position shown,

(a) determine the angular velocity and angular acceleration of the disk.

(b) determine the velocity and acceleration of P on the disk.

Leave your answers in terms of, at most, R, ω_1 and ω_2. Write your answers as vectors in terms of their xyz-components.

HINT: Consider using an observer attached to the disk, as shown.