CONSTANT ANGULAR ACCELERATION - Q1.0

1. A turntable starts from rest. After 3.2 sec of constant angular acceleration, $\omega_f = 5\,Rad/s$. Find α.

2. The angular velocity of a spinning object varies as: $\omega = 4t + 3$, where ω is in Rad/s.
   (a) Find the initial angular velocity. (b) What is the angular acceleration?
   (c) Find ω at t = 2 sec.

3. The angular position of a ray on a rotating turntable is given by:
   $\theta = 6t^2 + 7t + 1$ (θ is in radians)
   (a) Find the initial angular position of the ray. (b) What is the angular acceleration?
   (c) $\omega_0 = ?$

4. A turntable is spinning with an angular velocity of $40\,Rad/s$ and then slows to a stop with a
   constant angular deceleration of $5.2\,Rad/s^2$, find (a) the angular displacement and
   (b) the number of revolutions made as the turntable comes to rest.

5. State the Merton Rule for average angular velocity and indicate one condition under which
   it is true.

6. If $\omega_0 = 9\,Rad/s$ and angular acceleration is $4.3\,Rad/s^2$, then find ω_f after 2.7 sec.

7. If $\omega_0 = 2\,Rad/s$ and angular acceleration is $-1.5\,Rad/s^2$, then find ω_f when $\Delta\theta = -4\,Rad$.

8. The angular position (in Radians) of a ray on a turntable is given by:
   $\theta = t^2 - 4t + 3$ for t ≥ 0 sec.
   (a) What is θ_0? What quadrant (I, II, III or IV) is the ray initially in?
   (b) What is ω_0? Is the ray initially rotating clockwise(cw) or counterclockwise(ccw)?
   (c) What is α? Is the direction of angular acceleration clockwise(cw) or counterclockwise(ccw)?
   (d) Write the ω or angular velocity as a function of time.
   (e) Is $|\omega|$ or the angular speed of the ray going to initially increase or decrease?
   (f) When is ray going to stop and change directions?
   (g) Where is the ray when it changes its direction?
   (h) What is the angular displacement, $\Delta\theta$, after the first three seconds?
   (i) What is the angular distance traveled after the first three seconds?