Homework Set 12 A

PH 112 – 10

Q1. Can a single force applied to a body change both its translational and rotational motion? Explain.

P1. Calculate the torque (magnitude and direction) about point O due to the single applied force indicated in each of the situations shown below. In each case, the force and the rod both lie in the plane of the page, the rod has a length of 4.00 m, and the force has a magnitude of 10.0 N.



P2. Calculate the net torque about point O for the two forces applied as shown in the figure below. The rod and the forces are in the plane of the page.



P3. A square metal plate 0.180 m on each side is pivoted about an axis through point O at its center and perpendicular to the plate. Calculate the net torque about this axis due to the three forces shown in the figure below if the magnitudes of the forces are: F1 = 18.0 N, F2 = 26.0 N, and F3 = 14.0 N. The plate and all forces are in the plane of the page.



P4. Three forces are applied to a wheel of radius 0.350 m, as shown in the figure below. One force is perpendicular to the rim, one is tangent to it, and the other one makes a 40.0° angle with a radial line. What is the net torque on the wheel due to these three forces for an axis perpendicular to the wheel and passing through its center?

