1.   A net torque of 26.0 [Nm] acts on a wheel and causes an angular acceleration 21.0 [rad/s^2], what is the wheel's rotational inertia?

2.   A centrifuge rotor rotating at 10 [rad/s] is shut off and is eventually brought uniformly to rest (i.e., constant deceleration) by a frictional torque of 0.90 [Nm]. The mass of the rotor is 5 [kg] and it can be approximated as a solid cylinder of radius 1.2 [m] (I = 1/2mr^2),
        a.   What is the rotational inertia of the rotor?
        b.   What is the angular acceleration of the rotor while the frictional torque is acting on the rotor?
        c.   Through how many radians will the rotor turn before coming to rest?
        b.   How long will it take to bring the rotor to rest?

3.   The gravitational potential energy function of an object on planet Surium is U(x) = 191/(2 + x) [J]. What force is acting on the object when it is 3 [m] above the surface of planet Surium?

4.   The velocity of an object as a function of time is given by v(t) = 4t^3 [m/s].
        a.   Derive an expression for the object's position vs. time equation including the constant of integration.
        b.   Find the constant of integration if x(0) = 0.
        c.   What is the change in position of the object from time 2 [s] to 7 [s]?

AP FRQs
5.   1999 #3 a and b only (Disk-Block-Rod System)

6.   2008 #1 (Writing/solving differential equations)

Extra Problems:
E1.   An electrical motor provides 0.50 [W] of mechanical power. How much time will it take the motor to lift a 0.1 [kg] mass at constant speed from the floor to a shelf 2.0 [m] above the floor?

        Equation: P = Work/time [J]/[s] = [W]

1.   1.23 [kg·m^2]

2a.   3.6 [kg m^2]
2b.   -0.25 [rad/s^2]
2c.   200 [rad]
2d.   40 [s]

3.   7.64 [N]

4a. $x(t) = t^4 + C$
4b.   C = 0
4c.   2385 [m]

5-9.   Will review in class

Extra Problem(s)
E1.   t = 3.92 [s]