Formula

$$\Delta d = \left(\frac{\vec{v}_f + \vec{v}_i}{2}\right)\Delta t \qquad \vec{v}_f = \vec{v}_i + \vec{a}_{av}\Delta t \qquad \Delta\vec{d} = \vec{v}_i\Delta t + \frac{1}{2}\vec{a}_{av}\Delta t^2 \qquad v_f^2 = v_i^2 + 2a_{av}\Delta d$$

$$v = \frac{d}{t} \qquad F_{Net} = ma \qquad \mu_K = \frac{F_K}{F_N} \qquad f = \frac{1}{T} \qquad T = \frac{1}{f} \qquad tan\emptyset = \frac{\sin\emptyset}{\cos\emptyset}$$

$$a_c = \frac{v^2}{r} \qquad a_c = \frac{4\pi^2 r}{T^2} \qquad a_c = 4\pi^2 r f^2 \qquad F_{net} = \frac{mv^2}{r} \qquad F_{net} = \frac{4\pi^2 rm}{T^2} \qquad F_{net} = 4\pi^2 mrf^2$$

For all final answers, keep ONE DECIMAL places of accuracy please.

1. True and False (5 marks)

   (a) Any object that is travelling at a constant velocity is not accelerating. _____

   (b) Centripetal force is the force that keeps objects on a circular path. _____

2. What is the frequency of a 140g rubber stopper that experiences a centripetal acceleration of 44 m/s^2 on a 80 cm long string? (3 marks)

3. A 3.5-kg steel ball in a structural engineering lab swings on the end of a rigid steel rod at a constant speed in a vertical circle of radius 1.2m, at a frequency of 1.0 Hz, as in Figure 6. Calculate the magnitude of the tension in the rod due to the mass at the top (A) and the bottom (B) positions.

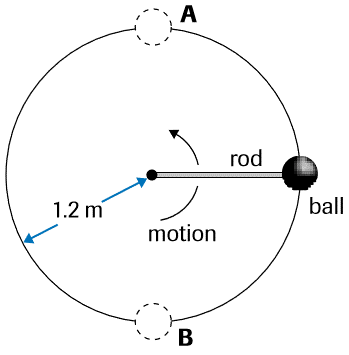

Figure 6