**[1].** A ball of mass m moving at speed of 4.2 m/s strikes an another ball of same mass which is at rest. After the collision, one ball is found to be moving at a speed of 2.1 m/s in a direction making a 60° angle with the original line of motion.

  (a) Find the velocity and direction of other ball.
 (b) What can you say about the collision, elastic or inelastic?

[2]. A solid sphere of mass $m = 1$ kg and radius $R=10$ cm rolls without slipping in a cylindrical trough of radius $5R$ as shown in Figure. The sphere is released from point A and passes through at the bottom of the trough (point B). Find
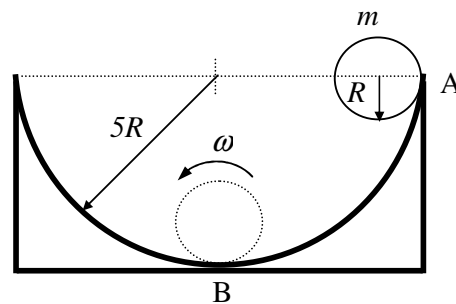
  (a) the angular speed of the sphere at point B
  (b) the linear momentum of the sphere at point B
  (c) the angular momentum of the sphere about its
     center of mass at point B

$(I_{\text{sphere}} = 2mR^2/5)$

[3]. The two blocks are connected over the pulley whose mass is $m = 0.6$ kg and radius $r = 3$ cm as seen in Figure. The mass of block A is 12 kg and block B is 24 kg. The coefficient of kinetic friction between the blocks and the surfaces are 0.20. Determine:
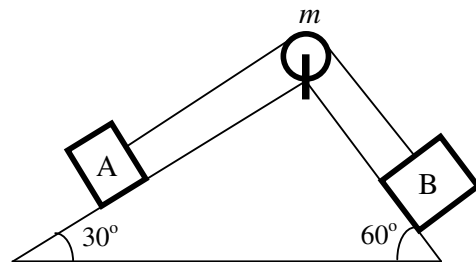
  (a) the linear acceleration of the blocks,
  (b) the angular acceleration of the pulley,
  (c) the tensions in the string

$(I_{\text{pulley}} = m r^2/2)$

[4]. A uniform steel meter bar, weighting 1 kg, rests on two scales at its ends. A 2 kg block is placed at the 15 cm mark. Find the reading on the scales.

Useful constants:
$g = 9.8$ m/s^2, sin30=0.5, cos30=0.86