(19)

1. Determine the necessary force P acting parallel to the plane to cause motion to impend (start to move). Assume the coefficient of friction is 0.25 and the pulley smooth. (25%)
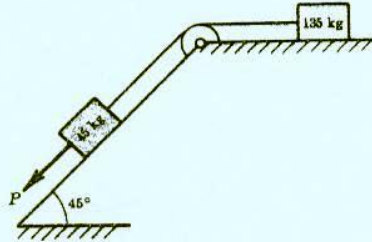
2. A cylinder 1 m in diameter and of 10-kg mass is lodged between the cross pieces which make an angle of 60° with each other as shown in the figure. Determine the tension in the horizontal rope DE assuming a smooth floor (i.e. only the vertical reactions). (25%)
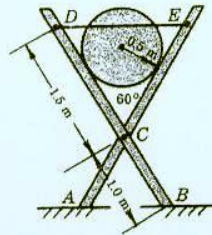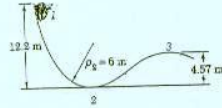

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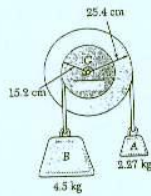
3. A car mass 100 kg starts from rest at point 1 and moves without friction down the track as shown in the following figure.

    (a) Determine the force exerted by the track on the car at point 2 where the radius of curvature of the track is 6 m.　　(10 %)

    (b) Determine the minimum safe value of the radius of curvature at point 3.　　(15 %)

4. A pulley mass 5.44 kg and having a radius of gyration of 20.3 cm is connected to two blocks as shown. Assuming no axle friction, determine the angular acceleration of the pulley and the acceleration of each block.　　(25 %)