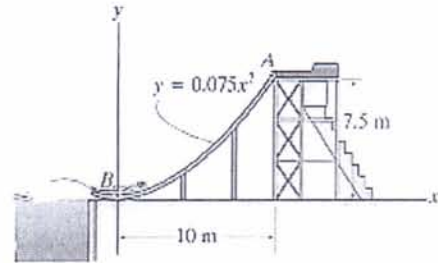




Exam Guidelines: This Exam contains 5 questions in 2 pages.

Question 1:[10 marks]

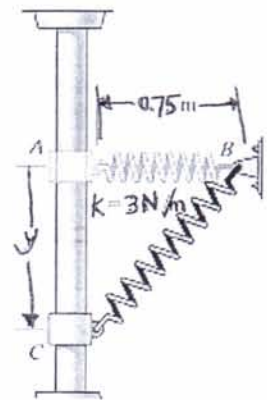
The 40-kg boy in Fig. (1) slides down the smooth water slide. If he starts from rest at A, determine his speed when he reaches B and the normal reaction the slide exerts on the boy at this position.



Fig(1)

Question 2:[10 marks]

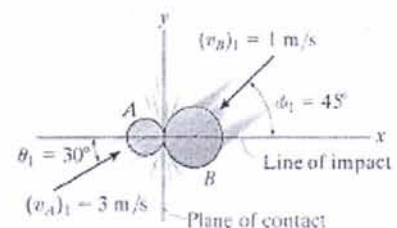
A smooth 2-kg collar, shown in Fig.(2), fits loosely on the vertical shaft. If the spring is unstretched when the collar is in the position A, determine the speed at which the collar is moving when $y = 1$ m, if it is released at A with an upward velocity $V_A = 3$ m/s.



fig(2)

Question 3:[10 marks]

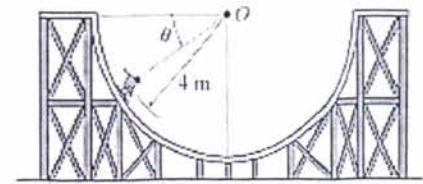
Two smooth disks A and E, having a mass of 1 kg and 2 kg, respectively, collide with the velocities shown in Fi. If the coefficient of restitution for the disks is $e = 0.75$, determine the x and y components of the final velocity of each disk just after collision.



Fig(3)

Question 4:[10 marks]

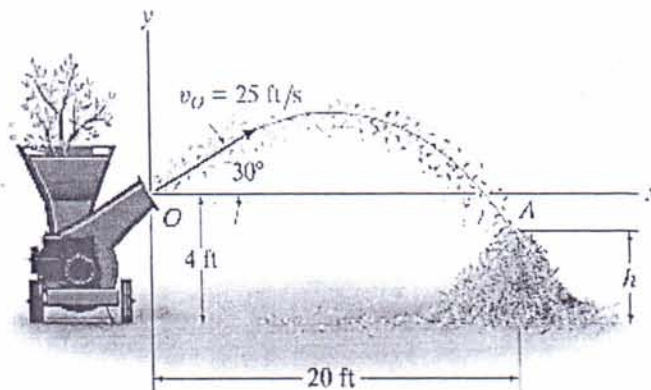
The 60-kg skateboarder in Fig(4) coasts down the circular track. If he starts from rest when $\theta = 0^\circ$, determine the magnitude of the normal reaction the track exerts on him when $\theta = 60^\circ$. Neglect his size for the calculation.



Fig(4)

Question 5:[10 marks]

The chipping machine is designed to eject wood chips at $V_0 = 25$ ft/s as shown in Fig(5). If the tube is oriented at 30° from the horizontal, determine how high, h , the chips strike the pile if at this instant they land on the pile 20 ft from the tube.



Fig(5)

With my best wishes

Dr. Mona Sameeh