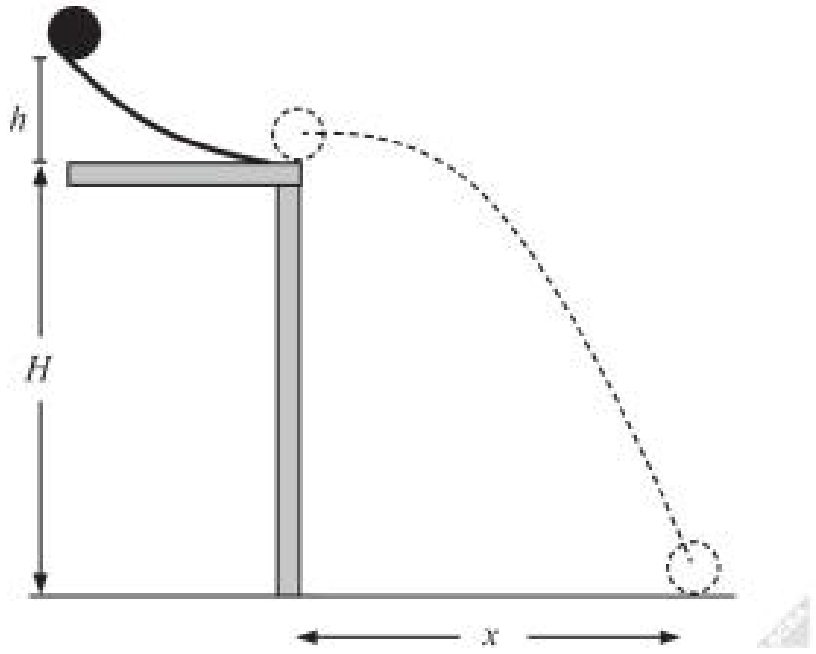
Question 12 **(15 marks)**

A ball is rolled from rest down a curved slope, across a flat, smooth table leaving the table horizontally and falling to the floor.



If h = 30.0 cm and H = 1.20 m

(a) Using conservation of energy, calculate the speed with which the ball leaves the table. Assume no energy is lost to friction, air resistance or is transferred to rotational energy.

(2 marks)

_____ m s^{-1}

(b) Calculate the distance x. (4 marks)

_____ m

(c) Calculate the velocity of the ball when it hits the floor. (5 marks)

_____ m s^{-1} Angle: _____ ° above horizontal

(d) Derive an expression for x in terms of h and H only. (Note: may include numbers.)
(4 marks)