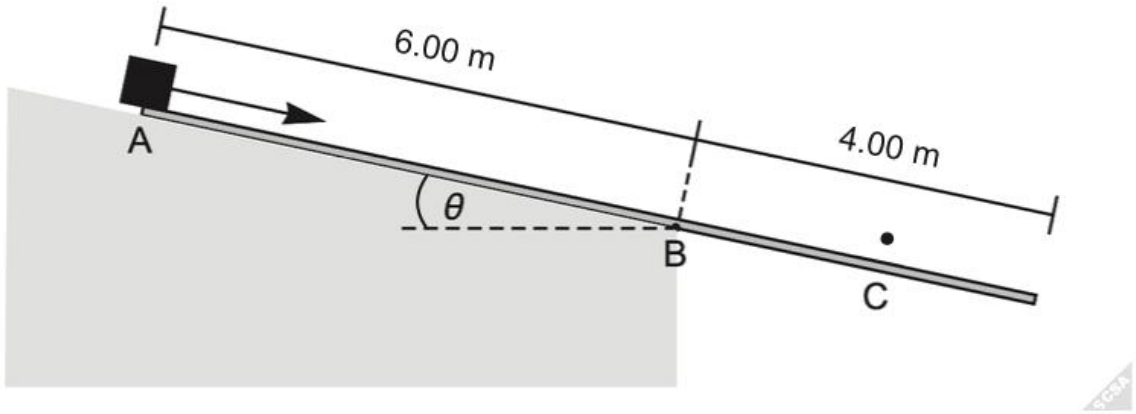
Question 6 **(5 marks)**

A student is set the task of determining the slope of a concrete structure using only a 15.0 kg beam, a ruler, a 5.00 kg mass with one smooth face and one rough face, and a stopwatch. She places the 10.0 m long uniform beam on top of the sloping structure with 4.00 m of the beam hanging over the end of the structure as shown in the cross-sectional diagram below. The student then places the 5.00 kg mass rough side down at increasing distances from B until the beam starts to tip over. She marks that place as C. The student then lets the 5.00 kg mass slide on its smooth side down the smooth beam from rest at A. She measures the time to reach C as 3.30 s.



(a) Calculate the distance between A and C. (3 marks)

Answer _____ m

(b) Ignoring friction, calculate the angle of the slope measured from the horizontal. (2 marks)

Answer _____ °