

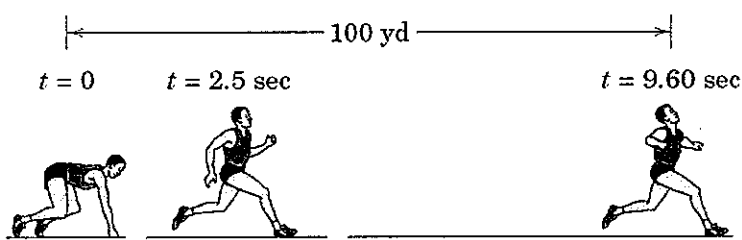
所別： 機電工程研究所 組別： 精密機械組/機電控制組 科目： 動力學

注意：准 一般計算器 工程用計算器，考試時間總計:100 分鐘。試題共 2 頁，第 1 頁

Total Marks: 100

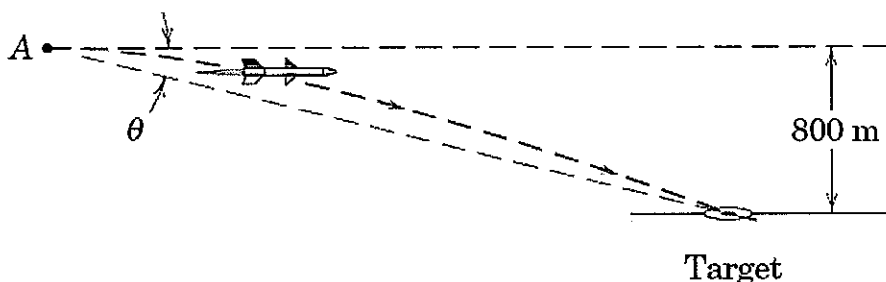
1. (20 Marks)

A sprinter reaches his maximum speed v_{\max} in 2.5 Seconds from rest with constant acceleration. He then Maintains that speed and finishes the 300 yard in the overall time of 9.60 seconds. Determine his maximum speed v_{\max} . (1 yard = 3 feet)



2. (30 Marks)

A rocket is released at point A from a jet aircraft flying horizontally at 1000 km/h at an altitude of 800 m. If the rocket thrust remains horizontal and gives the rocket a horizontal acceleration of 0.5 g, determine the angle θ from the horizontal to the line of sight to the target.

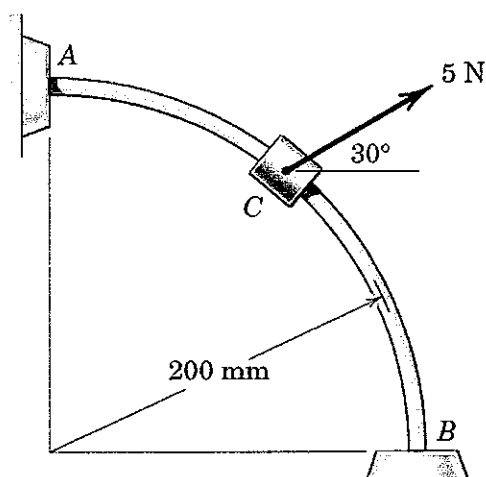


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3. (20 Marks)

The 0.5-Kg collar C starts from rest at A and slides with negligible friction on the fixed rod in the vertical plane. Determine the velocity v with which the collar strikes end B when acted upon by the 5-N force, which is constant in direction. Neglect the small dimensions of the collar.



4. (20 Marks)

The 10-kg block is resting on the horizontal surface when the force T is applied to it for 7 seconds. The variation of T with time is shown. Calculate the maximum velocity reached by the block and the total time Δt during which the block is in motion. The coefficients of static and kinetic friction are both 0.5.

