

大葉大學九十學年度研究所碩士班招生考試試題紙

系 所 組 別	考 試 科 目 (中 文 名 稱)	考 試 日 期	備 註
自動化工程學系 碩士班乙組	動力學	4 月 22 日 第 二 節	可使用計算機 p2 - 1

註：考生可否攜帶計算機或其他資料作答，請在備註欄註明（如未註明，一律不准攜帶）

（各題目圖示見第二頁，每題 20 分）

（詳列計算步驟，否則一概不給分）

1. During a test an elevator is traveling upward at 15m/s shown Figure 1 and the hoisting cable is cut when it is 40 m from the ground. Determine the maximum height s_B reached by the elevator and its speed just before it hits the ground. During the entire time the elevator is in motion, it is subjected to a constant downward acceleration of 9.81 m/s^2 due to gravity. Neglect the effect of air resistance. (20%)
2. A box starts from rest at point A shown Figure 2 and travels along the horizontal conveyor. During the motion, the increase in speed is $a_t = (0.2t) \text{ m/s}^2$, where t is in seconds. Determine the magnitude of its acceleration when it arrives at point B. (20%)
3. The motor M of the hoist operates with an efficiency of 0.85 shown Figure 3. Determine the power that must be supplied to the motor to lift the 375 N block C so that point P on the cable is being drawn in with an acceleration of 1.2 m/s^2 , and at the instant shown its speed is 0.6 m/s . Neglect the mass of the pulley and cable. (20%)

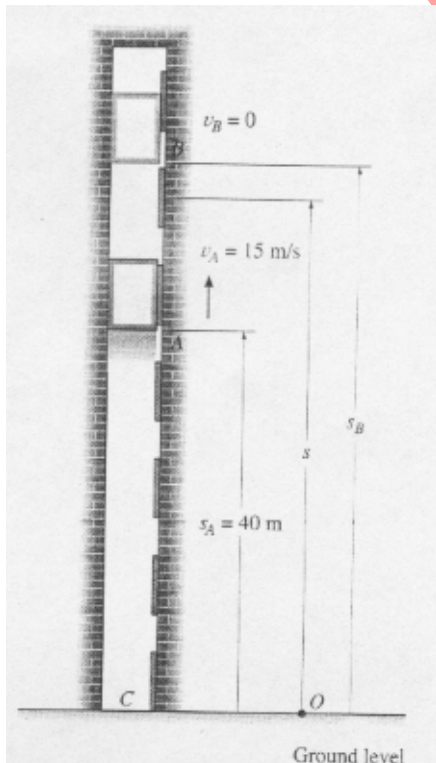


Figure 1 Elevator test

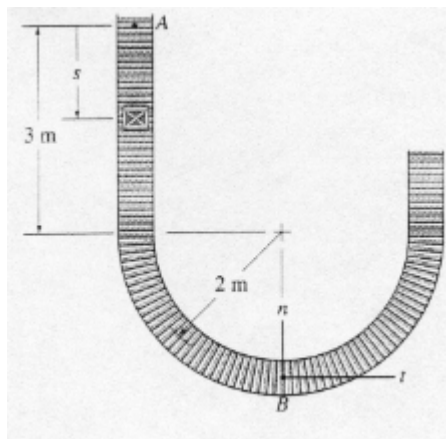


Figure 2 Horizontal conveyor

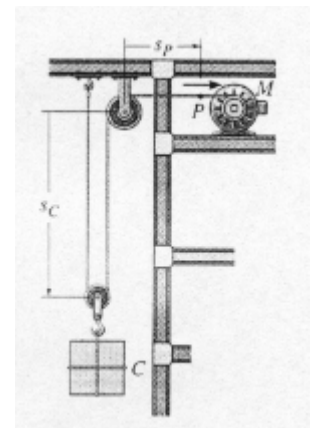


Figure 3 A Hoist

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4. The 10 kg block shown Figure 4 rests on the smooth incline. If the spring originally is unstretched, determine the total work done by all the forces acting on the block when a horizontal force $P = 400 \text{ N}$ pushes the block up the plane $s = 2 \text{ m}$. (20%)
5. Determine the banking angle θ of the circular track shown Figure 5 so that the wheels of the sports car will not have to depend on friction to prevent the car from sliding either up or down the curve. The car has a negligible size and travels at a constant speed of 30 m/s . The radius of the track is 180 m . (20%)

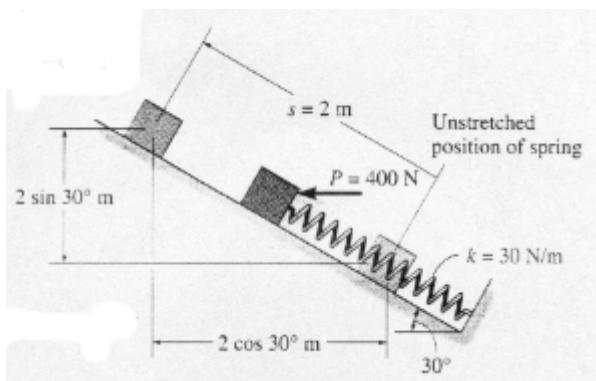


Figure 4 Block spring system

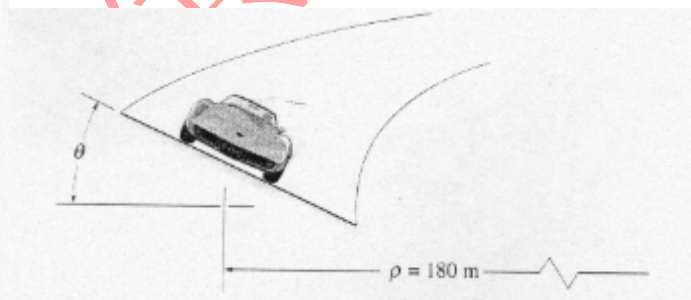


Figure 5 Sport car