國立成功大學104學年度碩士班招生考試試題

系所組別：系統及船舶機電工程學系乙組

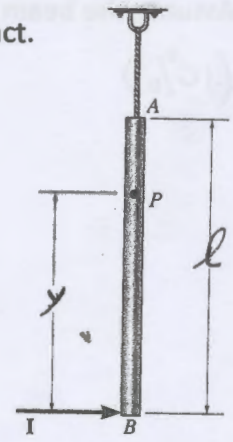
考試科目：動力學

考試日期：0211，節次：2

※ 考生請注意：本試題不可使用計算機。 請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

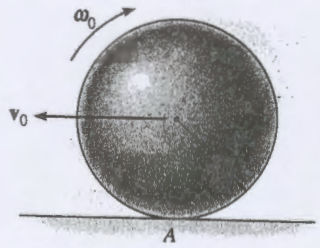
1. The slender rod has a mass **m** and is suspended at its end **A** by a cord. If the rod receives a horizontal blow giving it an impulse **I** at its bottom **B**, determine the location y of the point **P** about which the rod appears to rotate during the impact.

(20%)



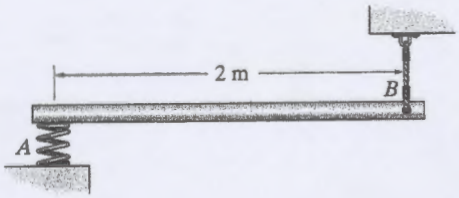
2. If the ball has a weight **W** and radius r and is thrown onto, a rough surface with a velocity $\mathbf{V_0}$ parallel to the surface, determine the amount of backspin, ω_0, it must be given so that it stops spinning at the same instant that its forward velocity is *zero*. It is not necessary to know the coefficient of friction at A for the calculation.

(20%)



3. The 4-kg slender rod is supported horizontally by a spring at **A** and a cord at **B**. Determine the angular acceleration of the rod and the acceleration of the rod's mass center at the instant the cord at **B** is cut. Hint: the stiffness of the spring is not needed for the calculation.

(10%)



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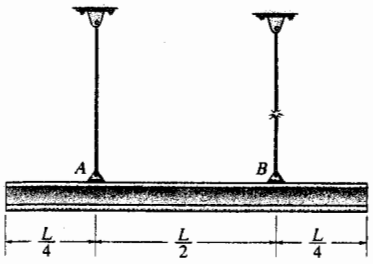
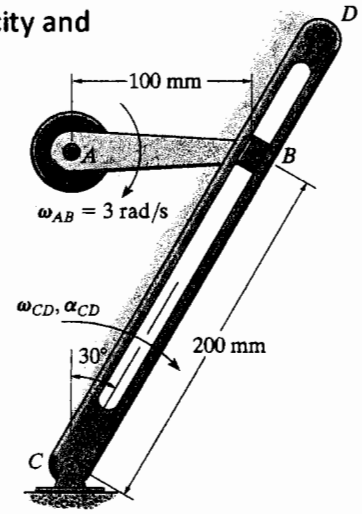
4. The uniform beam has a weight **W**. If it is originally at rest while being supported at A and B by cables, determine the tension in cable A if cable B suddenly fails. Assume the beam is a slender rod with length **L**.

(10%)



5. Block **B** of the mechanism is confined to move within the slot member CD. If AB is rotating at a constant rate of ω_{AB}= 3 rad/s, determine the angular velocity and angular acceleration of member CD at the instant shown.

(20%)



6. The winding drum **D** is drawing in the cable at an accelerated rate of 5 m/s^2. Determine the cable tension if the suspended crate has a mass of 800 kg.

(20%)