

國立臺灣科技大學

九十一學年度碩士班招生考試試題

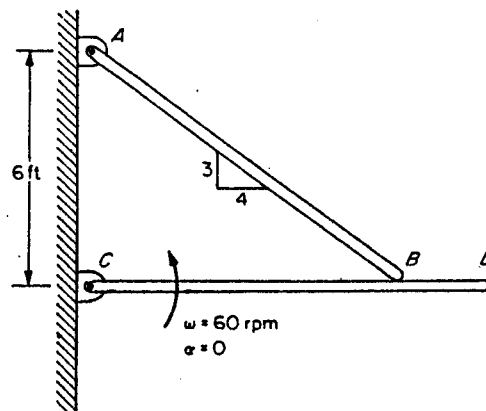
系所組別：機械工程系甲組、機械工程系丁組

科目：動力學

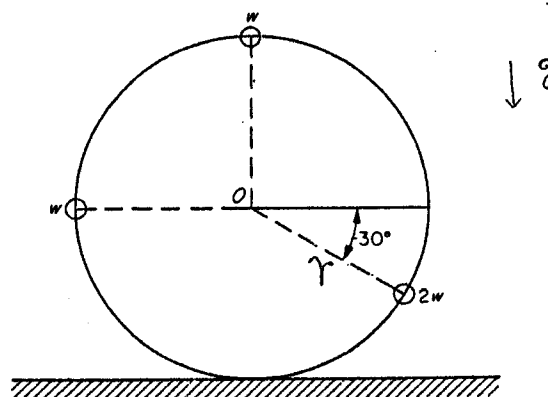
※ 總分：100分

共四題，每題 25 分，可不依序作答，但題號務必標示清楚。解題時請註明所依據的原理，並將自由體圖繪於答案卷上。

1. The horizontal bar CD in the figure rotates counterclockwise with a constant angular velocity of 60 rpm. Determine the angular velocity and acceleration of bar AB. Assume a smooth surface at B.



2. In the figure is shown a rigid ring of radius r to which are attached three particles whose relative weights are given. The ring is placed on a horizontal plane in this position with no angular velocity. What is the angular acceleration of the ring immediately after the ring is placed on the plane? Assume that the ring itself has negligible weight and does not slip on the plane.



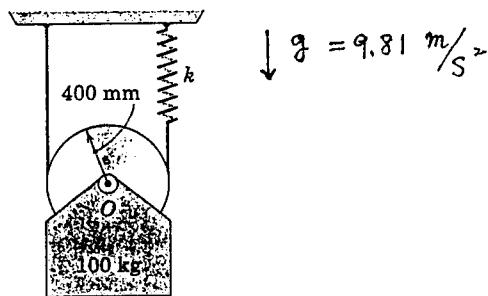
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3. The sheave of 400-mm radius has a mass of 50 kg and a radius of gyration of 300 mm. The sheave and its 100-kg load are suspended by the cable and the spring, which has a stiffness of 1.5 kN/m. If the system is released from rest with the spring initially stretched 100 mm, determine the velocity of O after it has dropped 50 mm.



4. A 240-mm-radius cylinder of mass 8 kg rests on a 3-kg carriage. The system is at rest when a force P of magnitude 10 N is applied as shown for 1.2 sec. Knowing that the cylinder rolls without sliding on the carriage and neglecting the mass of the wheels of the carriage, determine the resulting velocity of (a) the carriage, (b) the center of the cylinder.

