

110ME03

國立臺北科技大學 110 學年度碩士班招生考試

系所組別：1120 機械工程系機電整合碩士班乙組

第二節 工程力學 試題

第 1 頁 共 2 頁

注意事項：

1. 本試題共四題，每題 25 分，共 100 分。
2. 不必抄題，作答時請將試題題號及答案依照順序寫在答案卷上。
3. 全部答案均須在答案卷之答案欄內作答，否則不予計分。

1. The large window shown in Fig. 1 is opened using a hydraulic cylinder AB. If the cylinder extends at a constant rate of 0.2 m/s, determine the angular velocity and angular acceleration of the window at the instant $\theta = 30^\circ$. (25%)

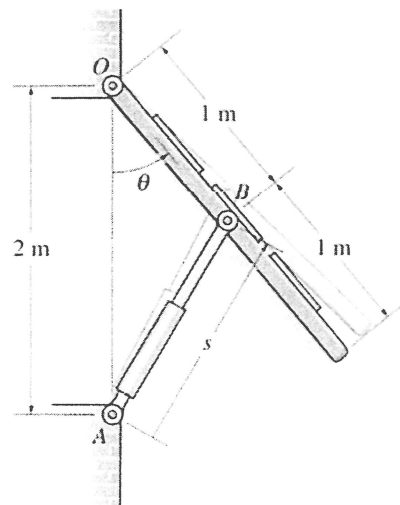


Fig. 1

2. The ram R shown in Fig. 2 has a mass 200 kg and is released from rest 0.75 m from the top of a spring, A , that has a stiffness $k_A = 12 \text{ kN/m}$. If a second spring B , having a stiffness $k_B = 15 \text{ kN/m}$, is nested in A , determine the maximum displacement of A needed to stop the downward motion of the ram. The unstretched length of each spring is indicated in the Fig. 2. Neglect the mass of the springs. (25%)

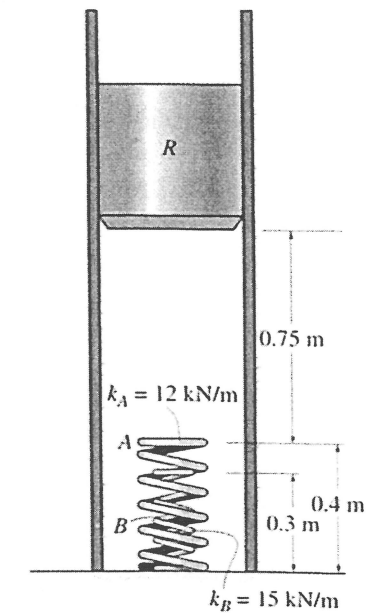


Fig. 2

3. The movable bracket shown may be placed at any height on the 3-in.-diameter pipe. If the coefficient of static friction between the pipe and bracket is 0.2, determine the minimum distance x at which the load W can be supported. Neglect the weight of the bracket. (25%)

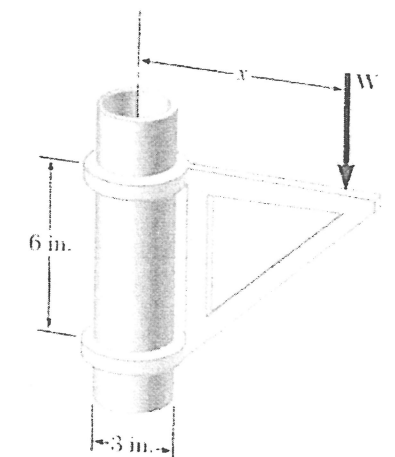


Fig. 3

注意：背面尚有試題

4. A fixed crane has a mass of 2000 kg and is used to lift a 2400-kg crate. It is held in place by a pin at A and a rocket at B . The center of gravity of the crane is located at G . Determine the components of the reactions at A and B . (25%)

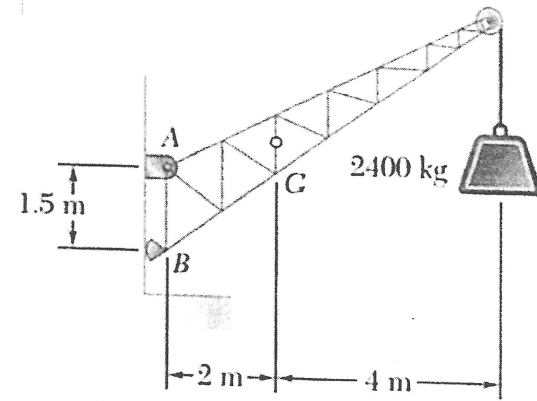


Fig. 4