國立成功大學

112學年度碩士班招生考試試題

編　　號：155

系　　所：生物醫學工程學系

科　　目：工程力學

日　　期：0206

節　　次：第 2 節

備　　註：可使用計算機

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

1. Explain the following terms: (20%)

    (a) Principle of virtual work (5%)

    (b) Radius of gyration. (5%)

    (c) Elastic and plastic impact. (5%)

    (d) Coefficient of static and kinetic friction, and which one is greater with the same given friction surface. (5%)

2. It is desired to drive a pile of weight W_p = 2800 kg into the ground by dropping a hammer of weight W_H = 600 kg at a distance of h = 6 m onto the pile, as shown in Figure 1. Determine the distance that the pile is driven into the ground by a single blow of the hammer, if it is assumed that the ground provides a constant resisting force of 3000 kg-force. Assume the impact to be perfectly plastic and the gravity g = 10 m/s^2. (20%)
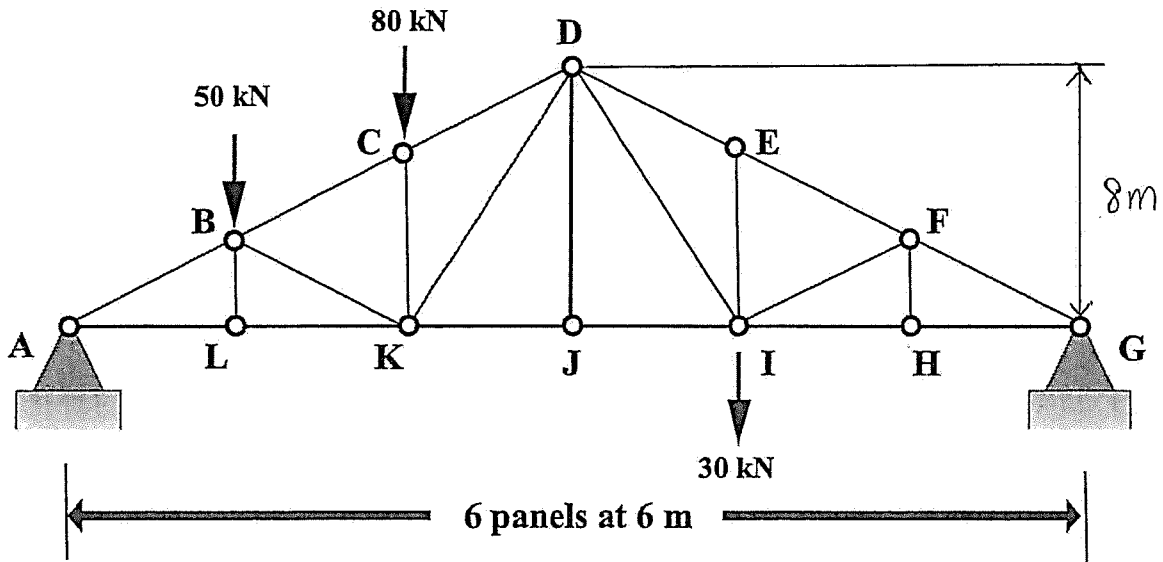
Figure 1
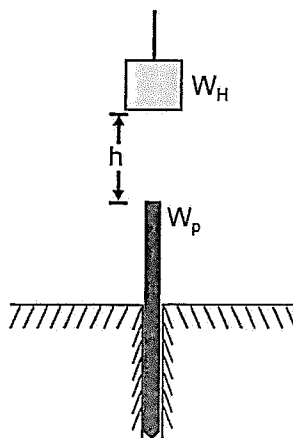
3. The rod AB is rotating at an angular velocity of 5 rad/s and the point A is a pin that slides on the groove of the connecting rod OR, as shown in Figure 2. Please determine (1) the relative velocity of the pin A to the OR (10%); (2) the angular velocity of the OR. (10%). (20%)

Figure 2
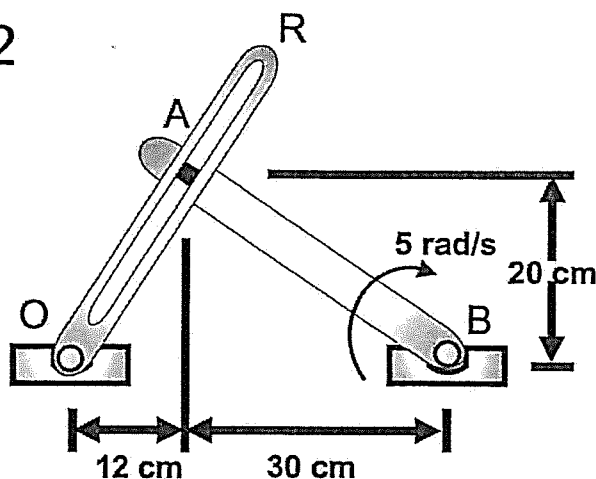
4. In Figure 3, calculate the force member *DJ, DC, and KJ* of the Howe roof truss illustrated. Neglect any horizontal components of force at the supports. (20%)

Figure 3

5. In Figure 4, a force P is acting on a jointly connected bars at point B. The other two ends A and C are connected by a stretched spring with a spring constant k. Consider massless for the two bars and no friction involved. Please determine the force generated by the spring to maintain equilibrium. (20%)

Figure 4