

國立臺北科技大學 102 學年度碩士班招生考試

系所組別：1511 自動化科技研究所甲組

第二節 工程力學 試題 (選考)

第一頁 共二頁

**注意事項：**

1. 本試題共五題，配分共 100 分。
2. 請標明大題、子題編號作答，不必抄題。
3. 全部答案均須在答案卷之答案欄內作答，否則不予計分。

- 一、The blocks A and B shown in Fig. 1 have a mass of 10 kg and 100 kg, respectively. Determine the distance B travels from the point where it is released from rest to the point where its speed becomes 2 m/s. (20%)

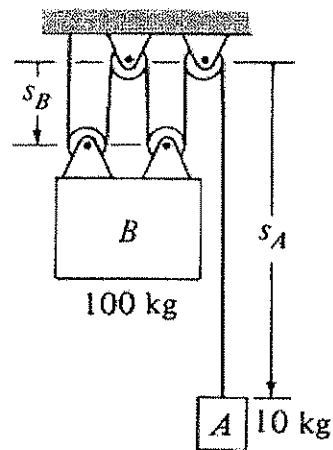


Fig. 1

- 二、The bag A, having a weight of 6 lb, is released from rest at the position  $\theta = 0^\circ$  as shown in Fig. 2. It strikes an 18 lb box B when  $\theta = 90^\circ$ . If the coefficient of restitution between the bag and box is  $e = 0.5$ , determine the velocities of the bag and box after impact. (20%)

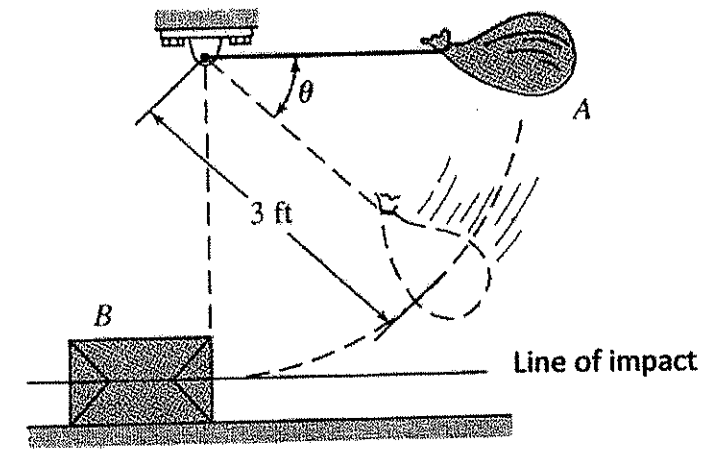


Fig. 2

- 三、The rod AB shown in Fig. 3 is confined to move along the inclined planes at A and B. If point A has an acceleration of  $3 \text{ m/s}^2$  and a velocity of  $2 \text{ m/s}$ , both directed down the plane at the instant the rod becomes horizontal, determine the angular acceleration of the rod at this instant. (20%)

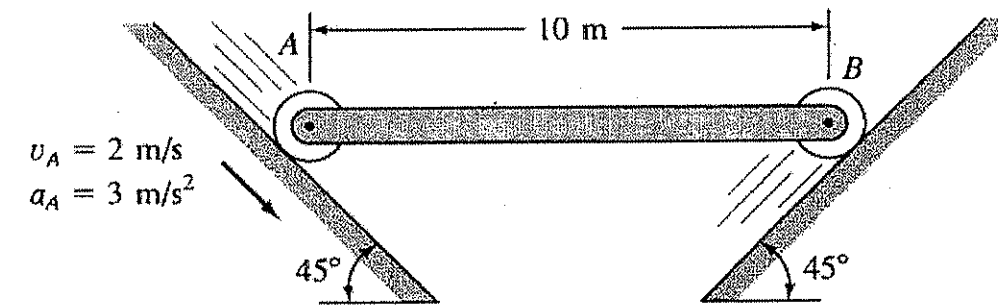


Fig. 3

注意：背面尚有試題

- 四、Two airplanes are flying at the same elevation and have the motions as shown in Fig. 4. Determine the velocity and acceleration of A as measured by the pilot of B. (20%)

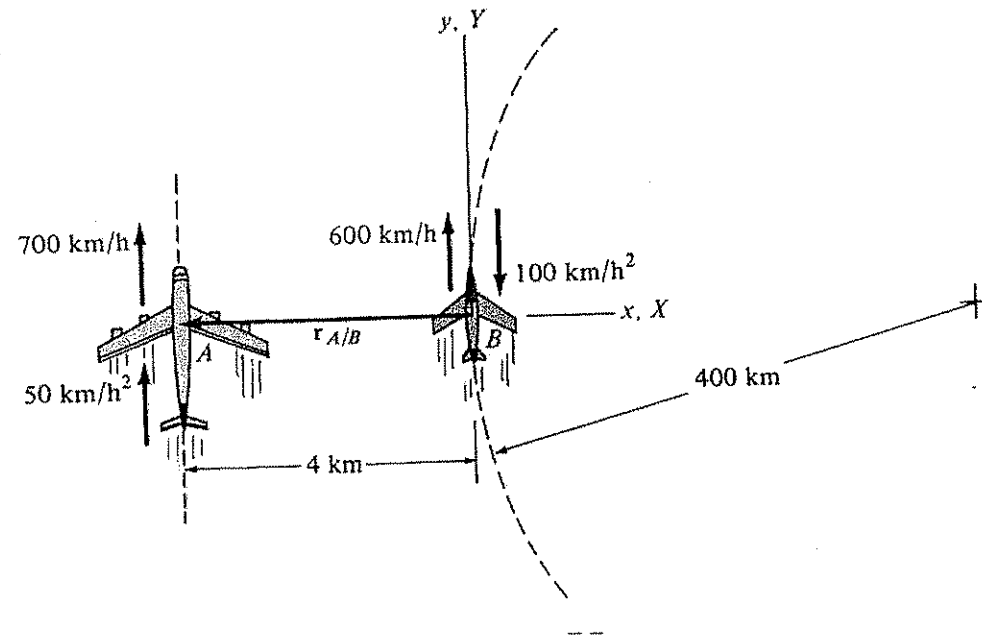


Fig. 4

- 五、Draw the shear and bending-moment diagrams for the beam AB. The distributed load of  $40 \text{ lb/inch}$  extends over  $12 \text{ inch}$  of the beam, from A to C. The  $400 \text{ lb}$  load is applied at E. (20%)

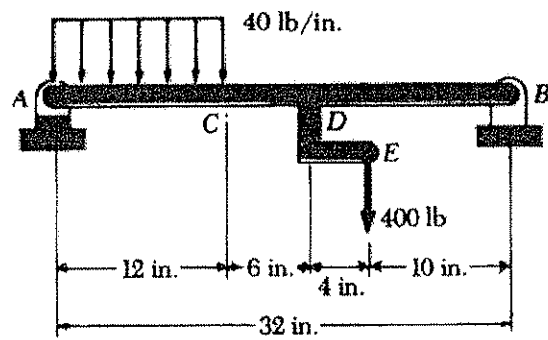


Fig. 5