國立臺北科技大學 103 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

第三節　工程力學　試題（選考）

> **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。

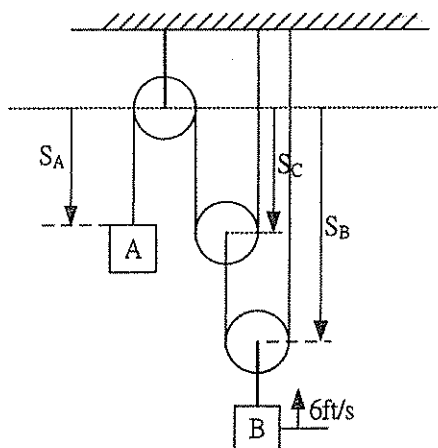一、Determine the speed of block A in Fig. 1, where block B has an upward speed of 6 ft/s. (20%)

Fig. 1

二、Two smooth disks A and B, having a mass of 1 and 2 kg, respectively, collide with initial velocities as shown in Fig. 2. If the coefficient of restitution for the disks is e=0.75, determine the x and y components of the final velocity of each disk after collision. Neglect friction. (20%)
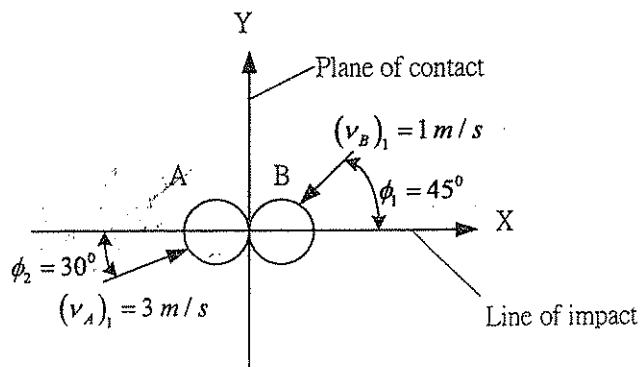

Fig. 2

三、 The collar C in Fig. 3 is moving downward with an acceleration of $1\ m/s^2$. At the instant shown, it has a speed of 2 m/s which gives links CB and AB an angular velocity $\omega_{AB} = \omega_{CB} = 10\ rad/s$. Determine the angular accelerations of CB and AB at this instant. (20%)
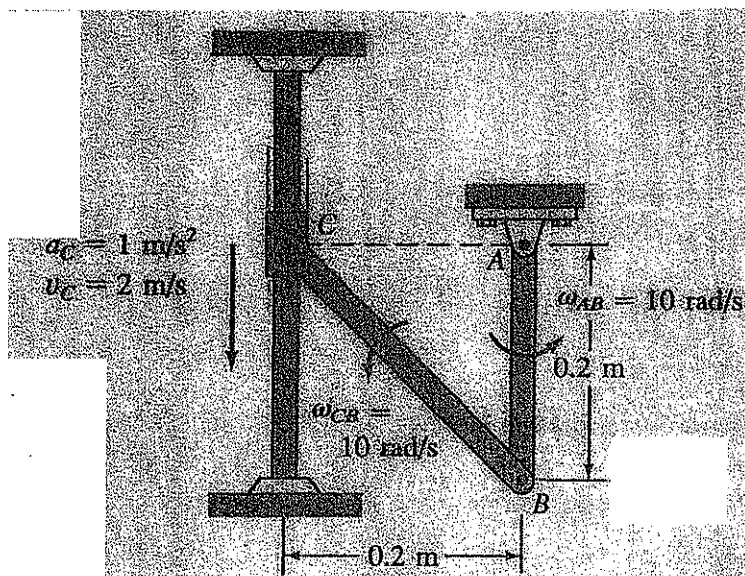

Fig. 3

四、 A 5×8 ft sign of uniform density weighs 270 lb and it supported by a ball and socket at A and by two cables. Determine the tension in each cable and the reaction at A. (20%)
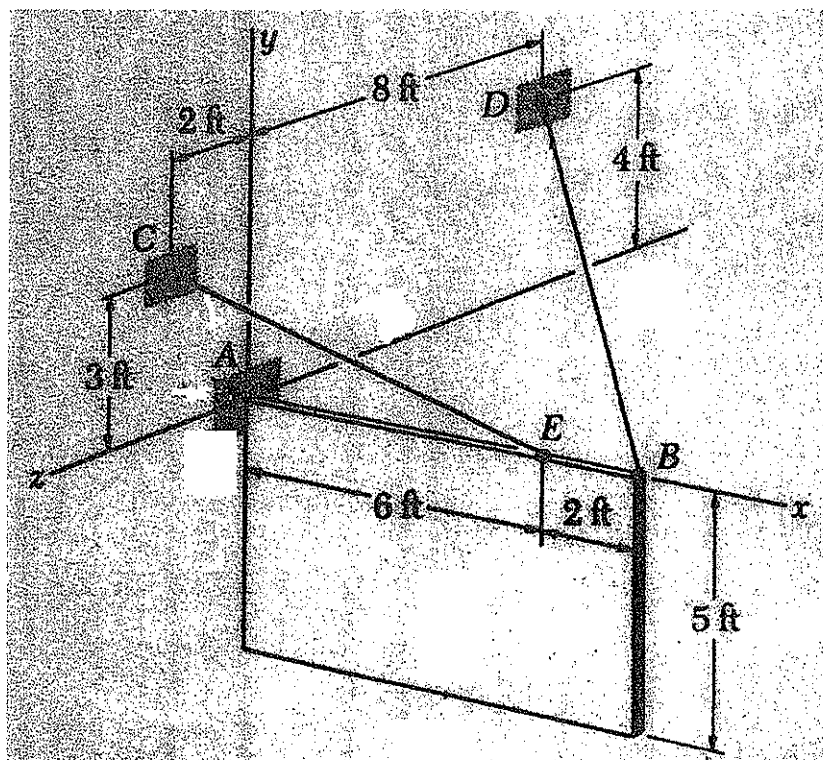

Fig. 4

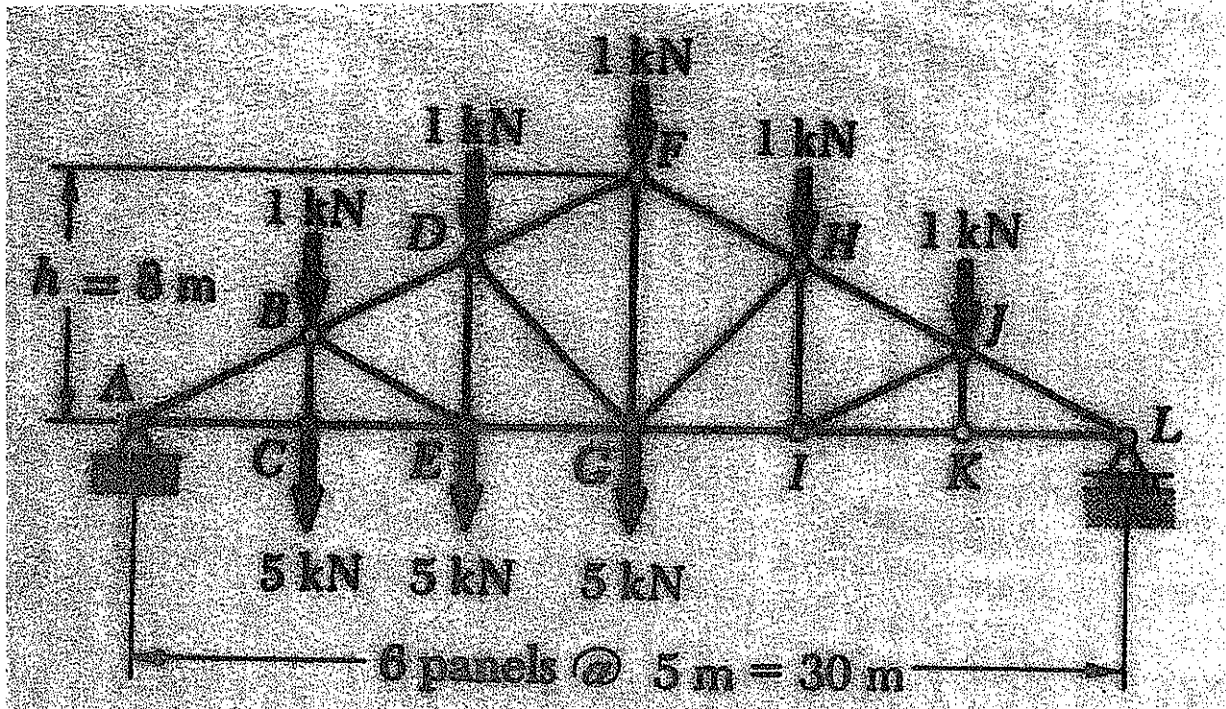五、Determine the force in members FH,GH, and GI of the roof truss shown in Fig. 5. (20%)

Fig. 5