107AT02

國立臺北科技大學107學年度碩士班招生考試

系所組別：1501 自動化科技研究所

第二節　工程力學　試題　（選考）

注意事項：

1. 本試題共5題，每題20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、Three loads are applied to a beam as shown in Fig. 1. The beam is supported by a roller at A and by a pin at B. Neglecting the weight of the beam, determine the reactions at A and B when P=15N. (20%)

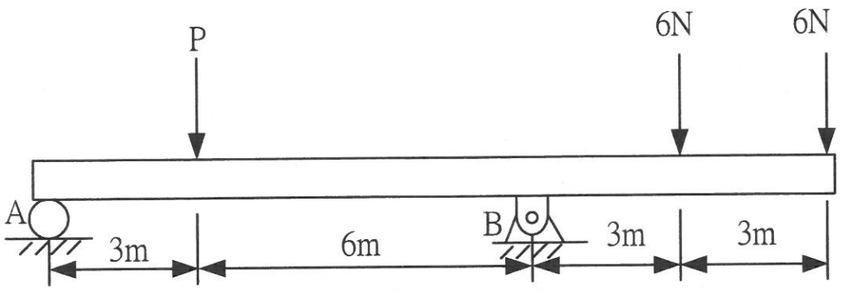

Fig. 1

二、Determine the force in members FH,GH, and GI of the roof truss shown in Fig. 2. (20%)

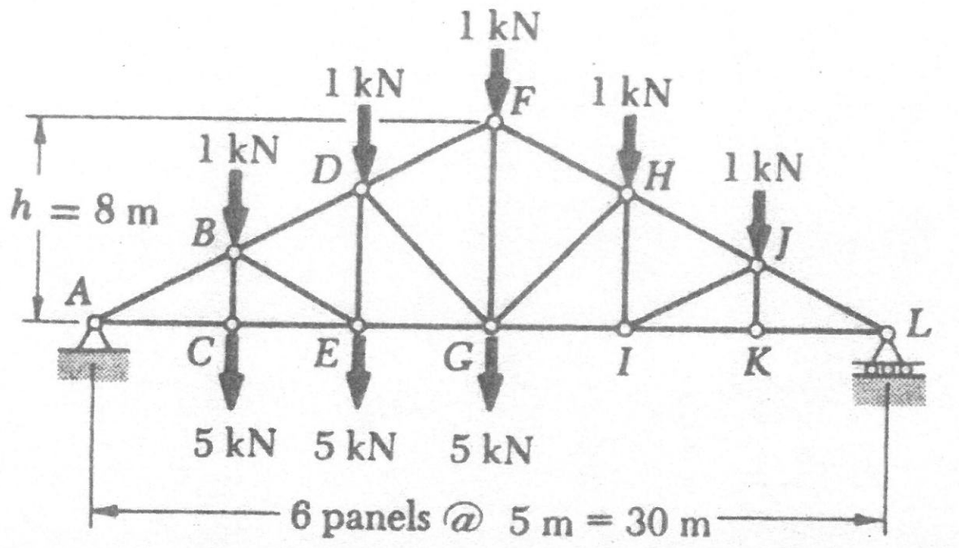

Fig. 2

三、The disk has a mass of 30 kg as shown in Fig. 3 and it is pin-supported at its center. If it starts from rest, determine the number of revolutions it must make to attain an angular velocity of 20 rad/s. Also, what are the reactions at the pin? The disk is acted upon by a constant force F=10N, which is applied to a cord wrapped around its periphery, and a constant couple moment M=5N-m. Neglect the mass of the cord in the calculation. (20%)

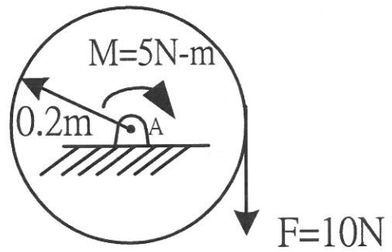

Fig. 3

注意：背面尚有試題

四、For the system shown with Ma=100kg, K=100 N/m, Mb=20kg, and coefficient of friction μ=0.2, find the velocity of block A after block B descended for 4m from rest. Assume the pulleys are negligible mass. (20%)

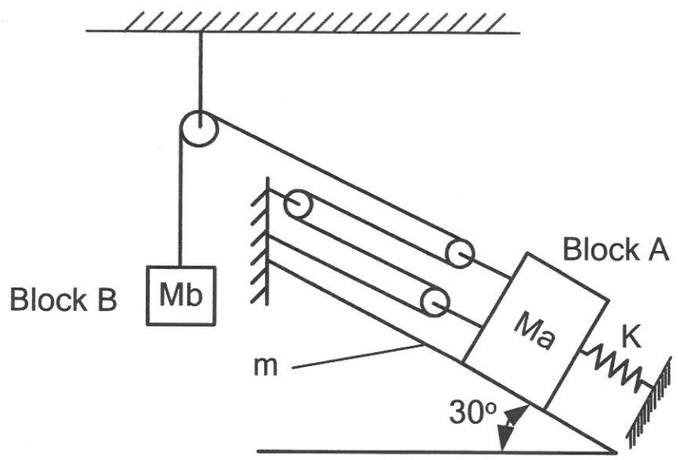

Fig. 4

五、Two smooth disks A and B, having a mass of 1 and 2 kg, respectively, collide with initial velocities as shown in Fig. 5. If the coefficient of restitution for the disks is e=0.6, determine the x and y components of the final velocity of each disk after collision. Neglect friction. (20%)

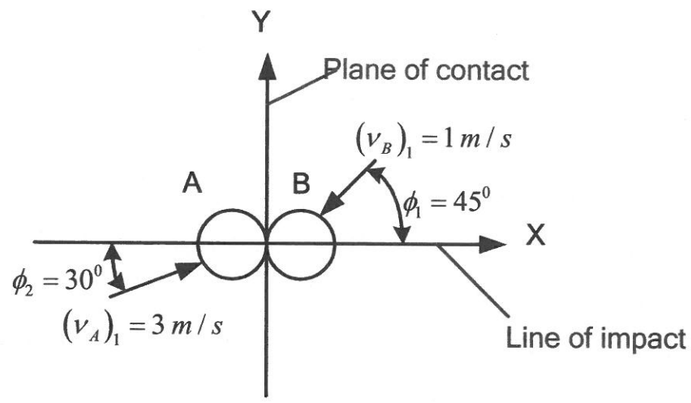

Fig. 5