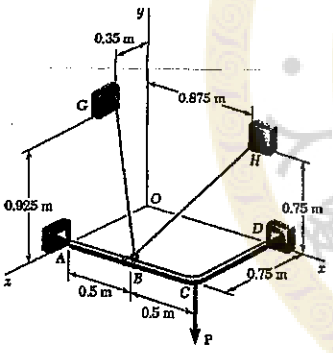
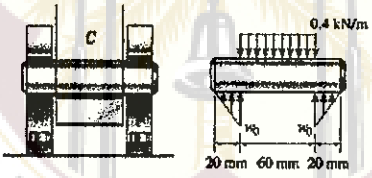
[Note: refer to the figures on bottom for the corresponding problems]

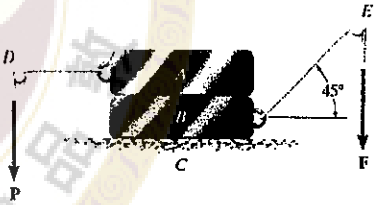
1. The frame *ACD* is supported by ball-and-socket joints at *A* and *D* and by a cable which passes through a ring at *B* and is attached to hooks at *G* and *H*. Knowing that the frame supports a load of magnitude $P = 268$ N at point *C*, determine the tension in the cable. (20 points)
2. The smooth pin is supported by two leaves *A* and *B* and subjected to a compressive load of 0.4 kN/m caused by bar *C*. Determine the intensity of the distributed load ω_0 of the leaves on the pin and draw the shear and moment diagrams for the pin. (15 points)
3. Blocks *A* and *B* have a mass of 100 kg and 150 kg, respectively. If the coefficient of static friction between *A* and *B* and between *B* and *C* is $\mu_s = 0.25$ and between the ropes and the pegs *D* and *E* $\mu'_s = 0.5$, determine the smallest force *F* needed to cause motion of block *B* if $P = 30$ N. (15 points)
4. The three balls each have a mass *m*. If *A* has a speed *v* just before a direct collision with *B*, determine the speed of *C* after collision. The coefficient of restitution between each ball is *e*. Neglect the size of each ball. (15 points)
5. At a given instant, rod *AB* has the angular motions shown. Determine the angular velocity and angular acceleration of rod *CD* at this instant. There is a collar at *C*. (15 points)
6. The 15-kg thin ring strikes the 20-mm-high step. Determine the smallest angular velocity the ring can have so that it will just roll over the step at *A* without slipping. (Hint: mass moment inertia of thin ring is mr^2) (20 points)



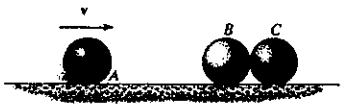
Problem 1



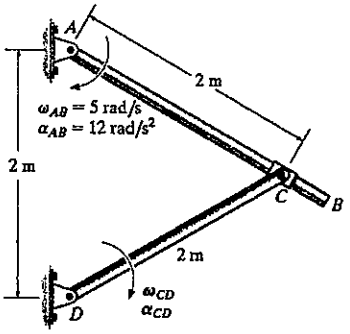
Problem 2



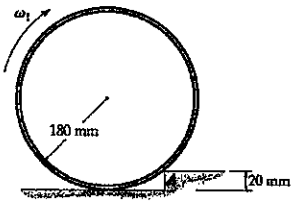
Problem 3



Problem 4



Problem 5



Problem 6

試題隨卷繳回