



College of Engineering & Technology

Department : Basic & Applied Science

Course Coordinator: Dr. Mervat Kamal

Course : Engineering Mechanics (1).

Course Code : BA 141

Final Exam : 9:00 -11:00

Date : 9th June 2012

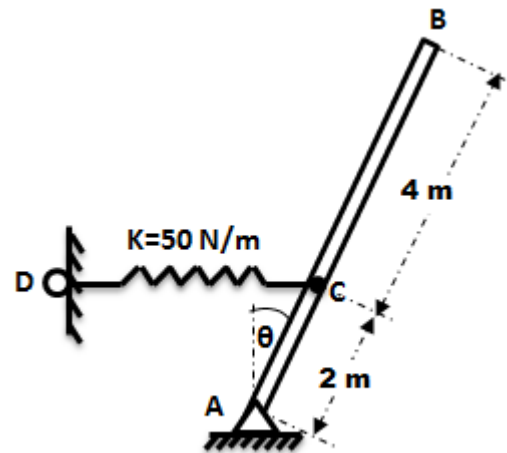
Marks: 40

Time: 2 Hrs.

Answer the following Questions:

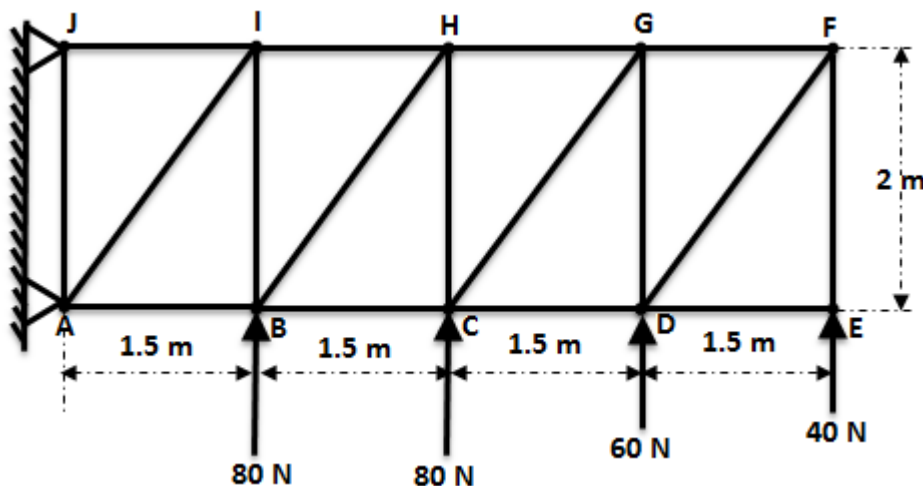
Question (1): (8 marks)

The uniform rod AB has a weight of 10 N. If the spring DC is unstretched when $\theta=0^\circ$ and the spring always remains in the horizontal position because of the roller guide at D. Determine the angle θ for equilibrium of the system (Hint neglect the effect of the roller).



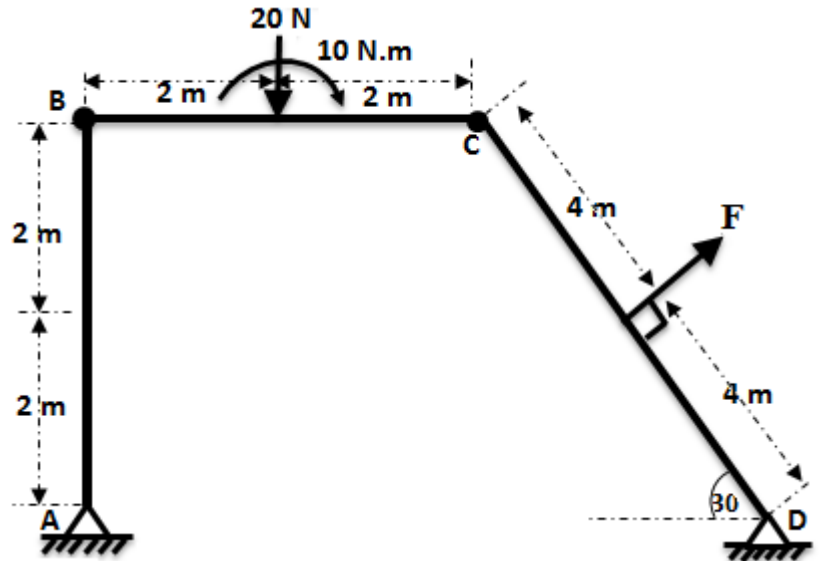
Question (2): (8 marks)

The internal drag truss for the wing of a light airplane is subjected to the forces shown. Determine the force in the members BC, BH and HC and state if the members are in tension or compression.



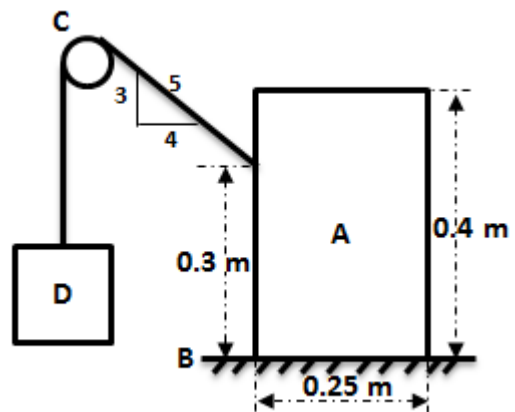
Question (3): (8 marks)

In the frame shown find the force F and the reactions at A, C and D of the shown Frame.



Question (4): (8 marks)

Block A has a mass of 50 kg and rests on surface B for which $\mu_s=0.25$. If the pulley at C is smooth, determine the greatest mass of the suspended cylinder D that will cause the block to have impending motion.

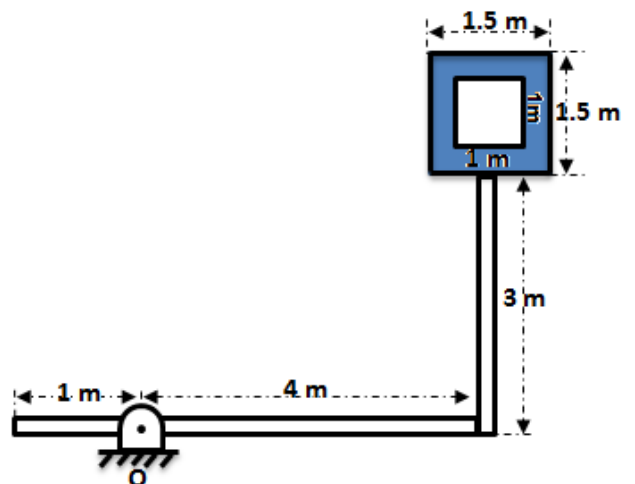


Question (5): (8 marks)

The pendulum consists of two rods and two plates. The mass of the rod is 5 kg/m. The thin plate has a mass of 10 kg/m². Determine the mass moment of Inertia of the pendulum about an axis perpendicular to the page and passing through O.

$$I_{GRod} = \frac{1}{12} ml^2$$

$$I_{GPlate} = \frac{1}{12} m(a^2 + b^2)$$



Good Luck