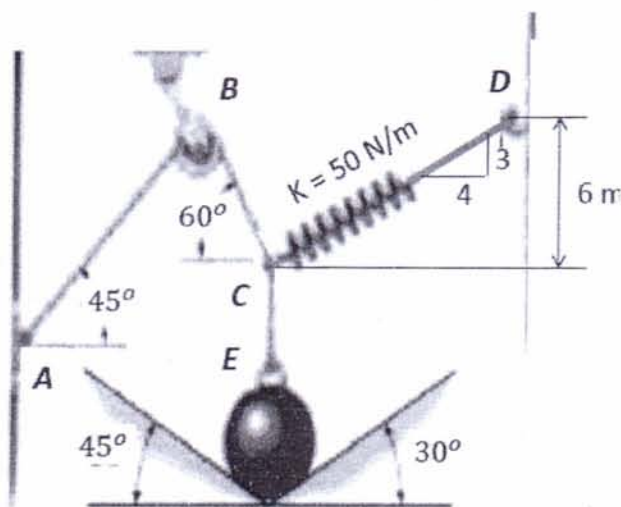


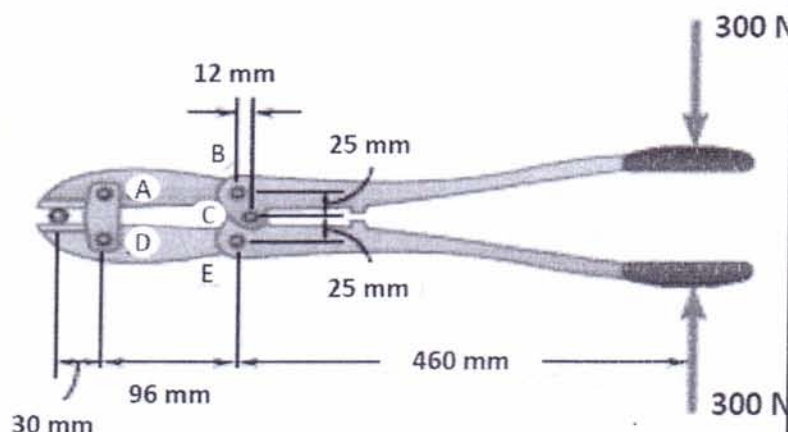
Exam Guidelines: This Exam contains **6 questions** in **2 pages**, start every question in a new page.

Question 1: [8 Marks] The 800 sphere is supported by two smooth inclined planes, spring CD , and two cables ABC and CE . Determine the forces of the smooth planes on the sphere and the unstretched length of the spring. If the tensile force of the cable ABC is 400 N.

Question 2: [7 Marks] In using the bolt cutter shown, a worker applies two 300 N forces to the handles. Determine the magnitude of the forces exerted by the pins B and C on the handle of the cutter. What is the mechanical advantage of the cutter.

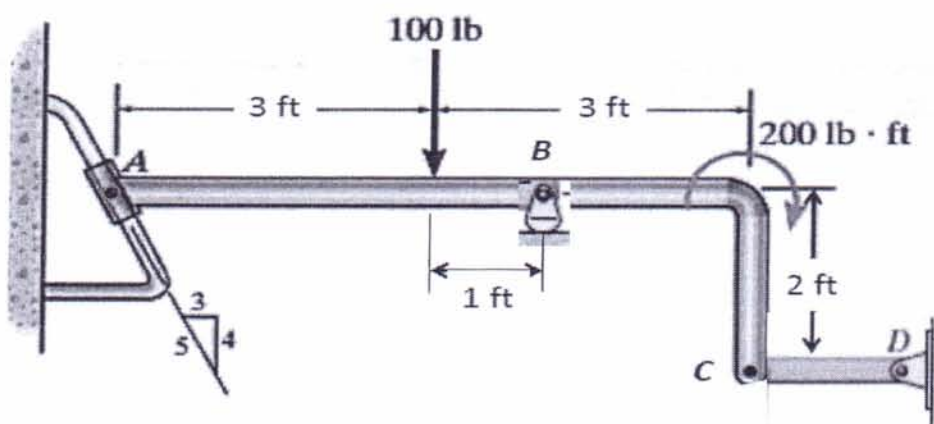


Question 1



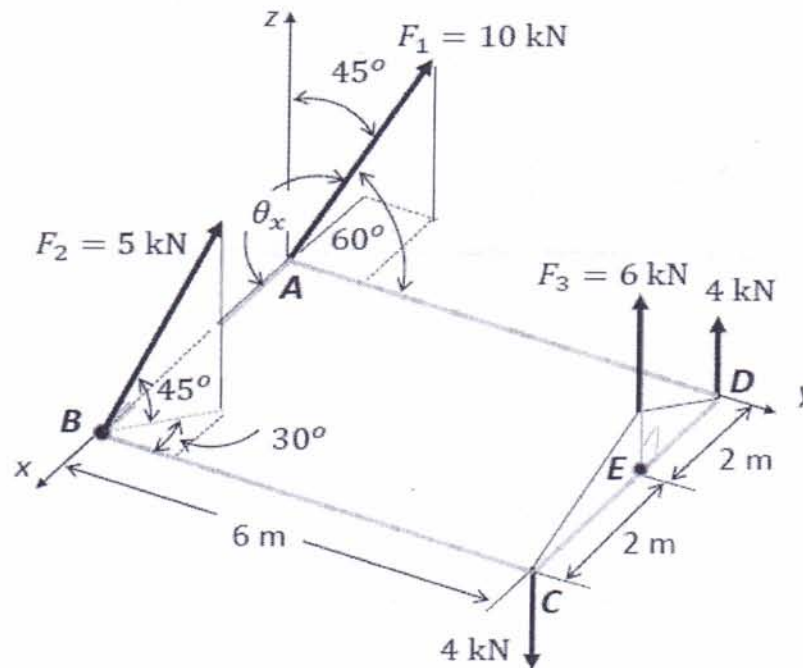
Question 2

Question 3: [12 Marks] The bent rod ABC shown is supported by a smooth collar at A , rocker at B , and short link at C . Determine the reactions at A , B , and C .



Question 3

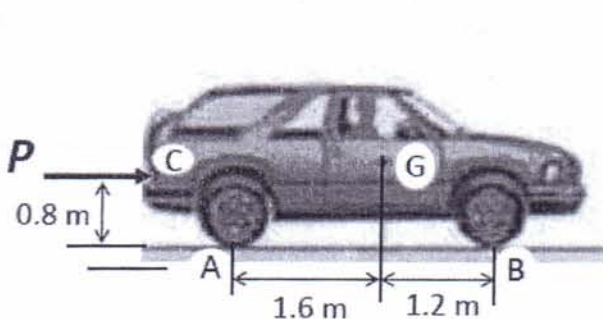
Question 4: [13 Marks] The slab بلاطة shown lies in x-y plane. Replace the forces-couple system acting on slab by a force-couple system at B. The force F_3 is vertical.



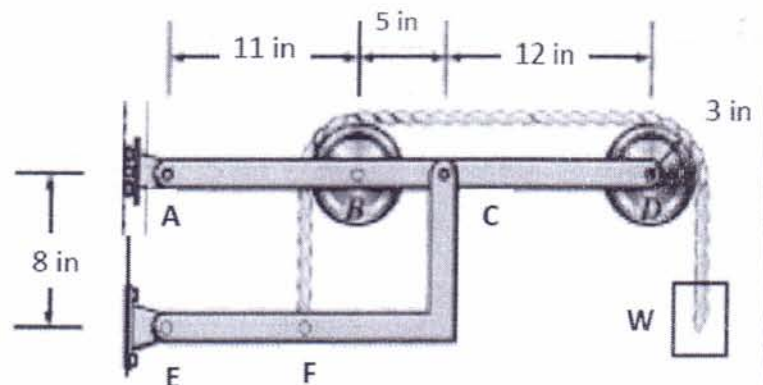
Question 4

Question 5: [6 Marks] The 3 Mg truck shown has a center at G. Determine the magnitude of the force P causes tipping انقلاب of the truck. Also, determine the value of the coefficient of static friction between the front wheels and the road. The brakes of the front wheels are locked, and the rear wheels are free to roll.

Question 6: [8 Marks] The frame shown is supported by rollers at A and pen at E. Determine the forces exerted on member CFE. Take $W = 400 \text{ lb}$.



Question 5



Question 6