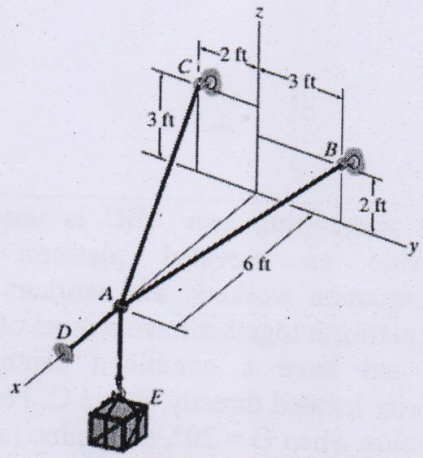
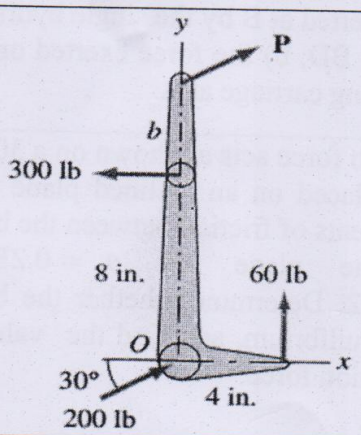
Mansoura University **Faculty of Engineering** **Math. & Eng. Physics Dept.**		**BME Program** **Fall Semester 2014/2015** **MATH002: Engineering Mechanics (1)**	**Date: 15 / 1 /2015** **Time: 2 hours** **Full mark: 50 marks**

Exam Guidelines: This Exam contains **6** questions in **2** pages. Start every question in a new page. The weight of each question is 9 marks.

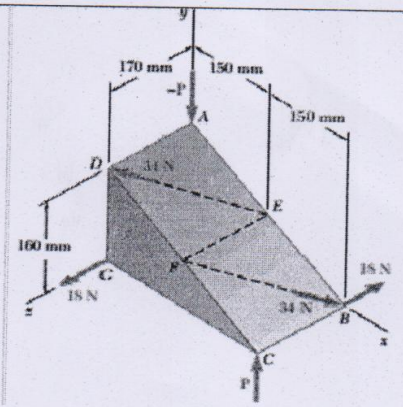
1- The 150-lb crate is supported by cables AB, AC and AD. Determine the tension in these wires.



2- The force system acting on the machine part is equivalent to the single force R=95i+10j lb acting at O. Determine the force P and the distance b.



3- I f P =20 N, replace the three couples with a single equivalent couple, specifying its magnitude and the direction of its axis



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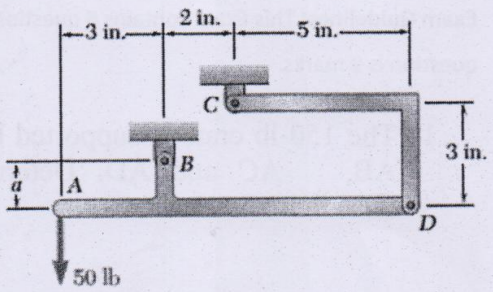
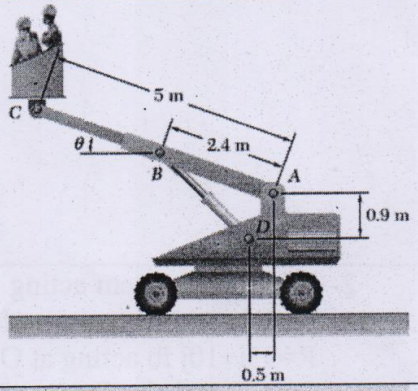
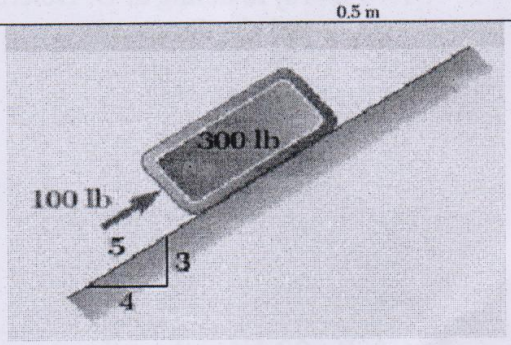
4- Determine the reactions at B and C when a = 1.5 in



5- The telescoping arm ABC is used to provide an elevated platform for construction workers. The workers and the platform together have a mass of 200 kg and have a combined center of gravity located directly above C. For the position when Θ = 20°, determine (a) the force exerted at B by the single hydraulic cylinder BD, b) the force exerted on the supporting carriage at A.



6- A 100-lb force acts as shown on a 300-lb block placed on an inclined plane .The coefficients of friction between the block and the plane are $\mu_s = 0.25$ and $\mu_k = 0.2$. Determine whether the block is in equilibrium, and find the value of the friction force.



With all best wishes
Dr.\ Mohamed Soror