Date: 11/2/2013   تخلفات إعدادى   Mansoura University
Time: 2 hours   First Semester 2012/2013   Faculty of Engineering
Full mark: 90 marks   Engineering Mechanics I   Math. and Phys. Science Dept.
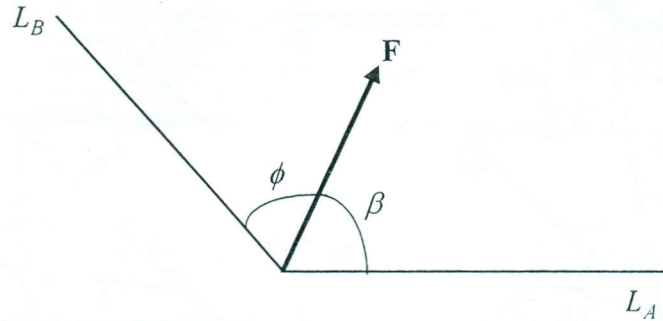
Exam Guidelines: This Exam contains **6** questions in **2** pages, start every question in a new page.

(1) [10 pt.] If the 400 N force **F** in Figure (a) lies in the plane defined by the intersecting lines L_A and L_B with $\beta = 80^o$ and $\phi = 60^o$. If we resolve the force **F** into two vector components parallel to L_A and L_B. Determine the magnitudes of the vector components


(2) [10 pt.] Two forces act on the hook shown in Figure. Specify the coordinate direction angles of F_2 so that the resultant force F_R acts along the positive y axis and has a magnitude of 800 N.
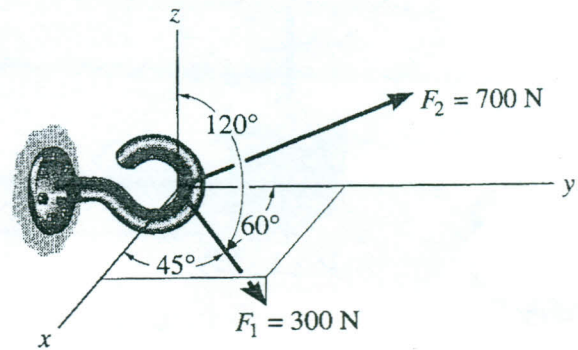
(3) [10 pt.] The link shown in Figure is pin-connected at A and rests against a smooth support at B. Determine the horizontal and vertical components of reaction at the pin A.

(4) [15 pt.] If the sack at A in Figure has a weight of 20 N, determine the weight of the sack at B and the force in each cord needed to hold the system in the equilibrium position shown.
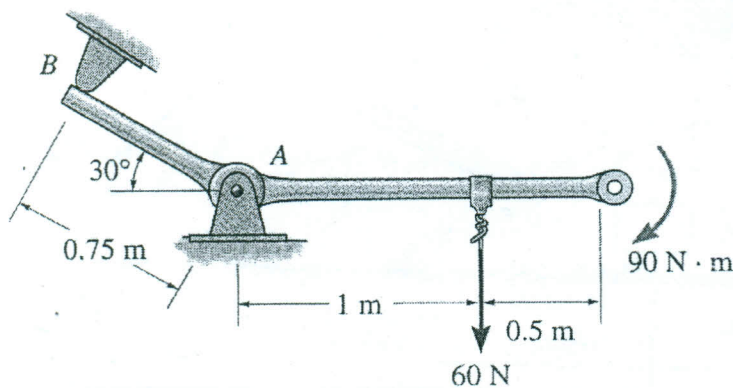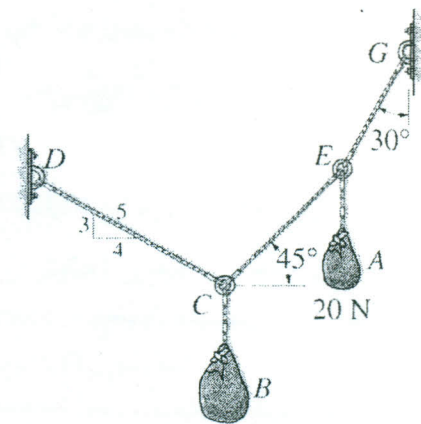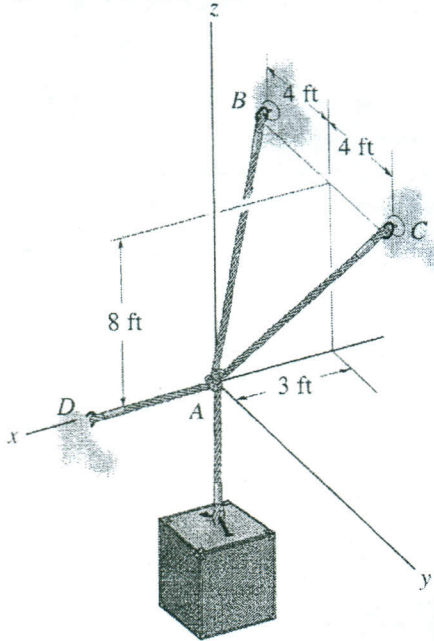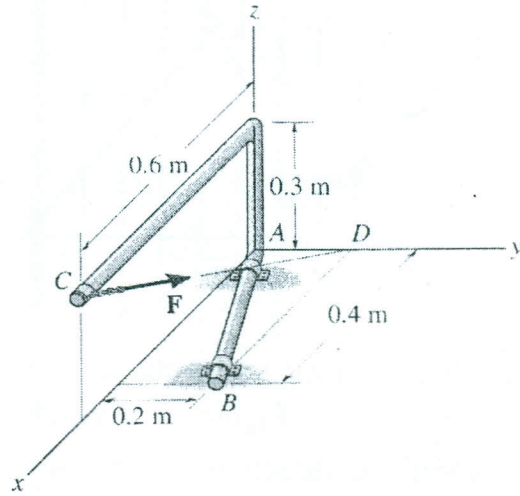

Prob. (3)   Prob. (4)

(5) [15 pt.] Determine the force developed in each cable used to support the 40 lb crate shown in Figure.

(6) [15 pt.] The rod shown in Figure is supported by two brackets at A and B. Determine the moment produced by the 700 N force $\mathbf{F}$, about point A and about the AB axis. Also determine the shortest distance from the force to the AB axis.
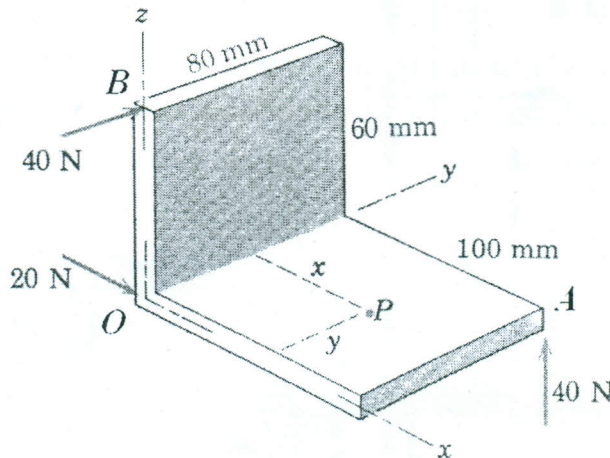
Prob. (5)   **Prob. (6)**

(7) [20 pt.] For the system of the three forces acting on the bracket, determine if it can be reduced to a single force. If it can, reduce it to the single force and if it can not, reduce it to the equivalent wrench. Calculate the coordinates of the point P in the x-y plane through which the resultant force or wrench acts.

Prob. (7)

With all best wishes