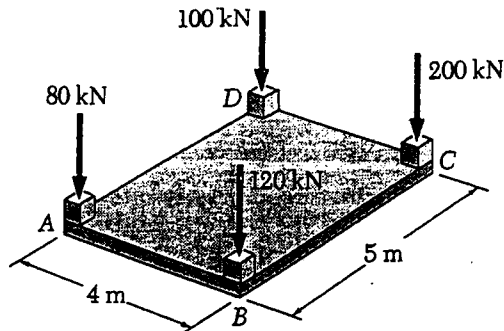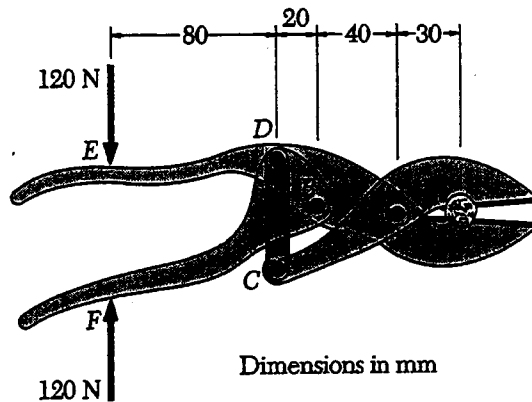1. (30pts) A rectangular concrete foundation mat supports four column loads as shown. Determine the magnitude and point of application of the resultant of the four loads.

2. (40pts) The upper blade and lower handle of the compound-lever shears are pin-connected to the main element ABE at A and B, respectively, and to the short link CD at C and D, respectively. Determine the forces exerted on a twig when two 120-N forces are applied to the handles.

Dimensions in mm

3. (30pts) Determine the moment of inertia of the area shown with respect to the x and y axes.