Problem Sheet #3 (Geometric Properties of Area)

Pb.3.1 The shaded area shown in fig. is bounded by the curve $y_1 = x^{1/3}$ & $y_2 = x^3$ Determine the y-coordinate of the centroid of this area which ends at (1,1). **(0.229)**

Pb.3.2 A thin sheet of metal 600mm by 1000mm has its two upper corner folded over along the inclined lines AC and DF as shown in fig.. In the regions bounded by the dotted lines the metal thus becomes doubly thick. Determine the y coordinate of the centorid of the folded sheet. **(491.3mm)**

Pb.3.3 Determine the moment of inertia of a rectangle about an axis through the centorid and parallel to the base. **($bh^3/12$)**

Pb.3.4 Derive the parallel axis theorem for moment of inertia of a plane area.

Pb.3.5 Determine the moment of inertia of a rectangle about an axis coinciding with the base. **($bh^3/3$)**

Pb.3.6 Determine the moment of inertia of a triangle about an axis coinciding with the base. **($bh^3/12$)**

Pb.3.7 Determine the moment of inertia of a triangle about an axis through the centorid and parallel to the base. **($bh^3/36$)**

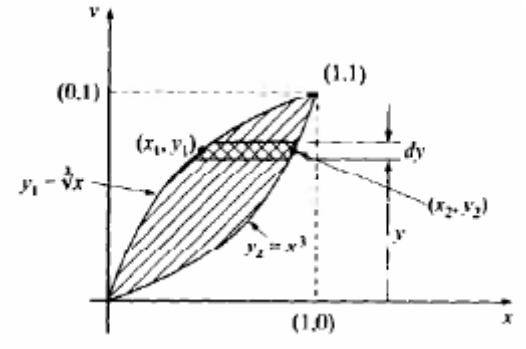
Pb.3.8 A trapezoidal areas has the dimensions indicated in fig. Determine the location of the centroid as well as the moment of inertia about an axis through the centroid and parallel to x- axis.**(44.4mm, $24.14 * 10^6$ mm^4)**

Pb.3.9 The structural channel section has welded to it a horizontal reinforcing plate as shown in cross section in fig. determine the y- coordinate of the centroid of the composite section. **(4.56 in)**

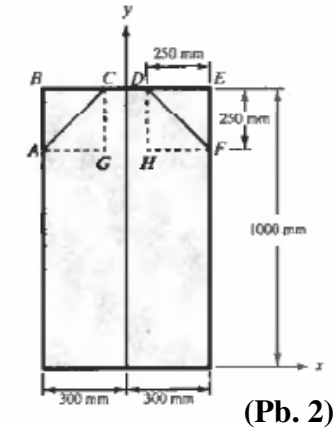
Pb.3.10 Determine the moment of inertia of a channel type section about a horizontal axis through the centroid. What is the radius of gyration about this same axis? **(231 in^4 , 2.40 in)**

Pb.3.11 Locate the centroid of the channel type section shown in fig. Determine the moment of inertia of cross sectional area about a horizontal axis through the centroid. **(38.33 mm, $33 * 10^6$ mm^4)**

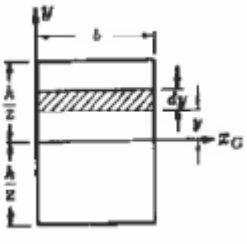
Prepared By:
Muhammad Farooq
Lecturer,
Mechanical Engineering Department,
UET Lahore (KSK-Campus).



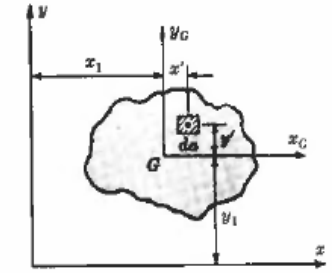
(Pb. 1)



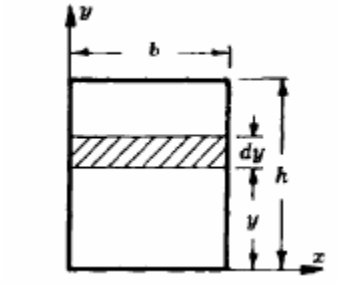
(Pb. 2)



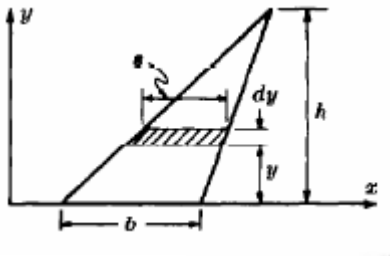
(Pb. 3)



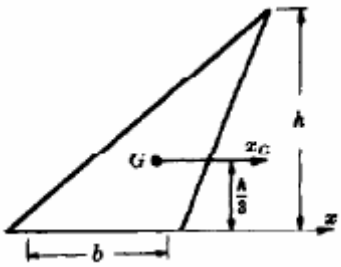
(Pb. 4)



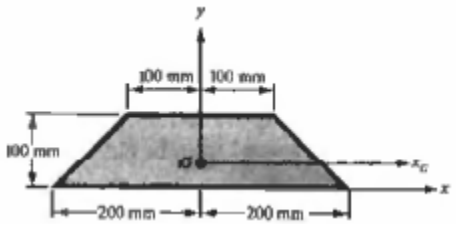
(Pb. 5)



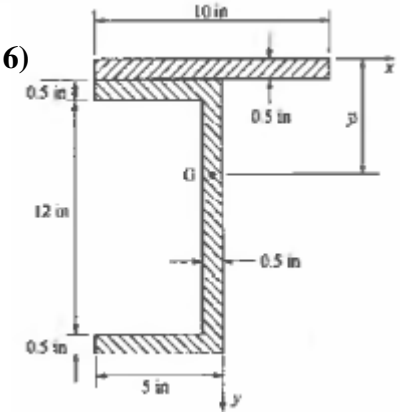
(Pb. 6)



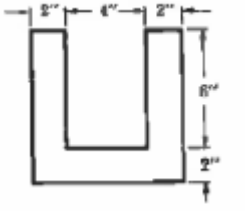
(Pb. 7)



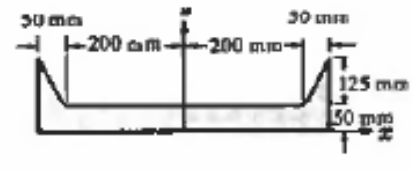
(Pb. 8)



(Pb. 9)



(Pb. 10)



(Pb. 11)