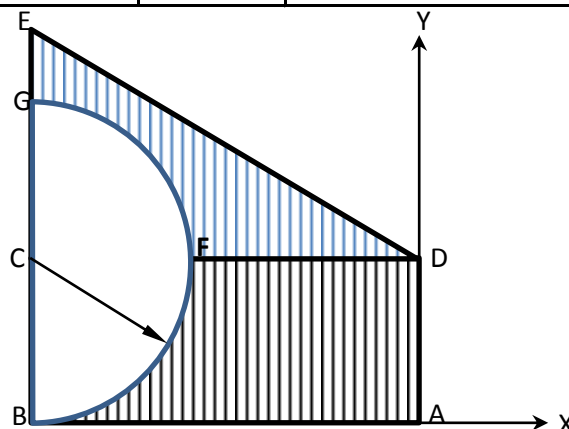




Academic year 2019/2020
First Year Civil Eng.
Date
Sheet 1 (CM & MOI)

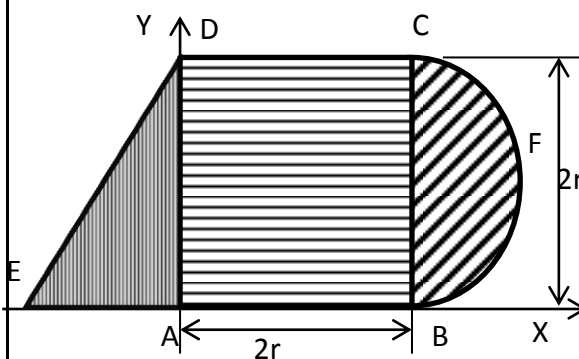


The Shown lamina is composed of a rectangular ABCD (AB= 9.6m) and a triangle plate DCE (CE= 4.2m). A semicircular plate GFB (r = BC = 3.2m) was removed from total lamina. The density of the lamina is constant $\rho = 5.5 \text{ Kg/m}^2$. Select the correct answer.



			A	B	C	D	E
1	Rectangular Plate ABCD	Xcg	-8.04	-4.50	-3.28	-7.22	None
2		Ycg	0.66	2.65	1.55	1.60	None
3		Ixx	576.72	378.98	1056.46	329.53	None
4		Iyy	5284.69	5190.45	5321.19	7056.20	None
5	Circular GFB	Xcg	-10.92	-2.69	-8.24	-6.52	None
6		Ycg	3.95	3.20	0.87	5.36	None
7		Ixx	546.52	9.73	1050.19	1132.38	None
8		Iyy	6072.73	1146.45	1627.25	1098.99	None
9	Triangular DCE	Xcg	-12.15	-6.40	-4.87	-1.84	None
10		Ycg	2.96	4.38	4.60	3.91	None
11		Ixx	4909.31	2874.66	2454.88	3431.05	None
12		Iyy	5109.35	10121.25	4502.12	6848.57	None
13	Total Lamina	Xcg	-6.11	-4.14	-0.57	-2.02	None
14		Ycg	0.37	4.16	2.19	2.60	None
15		Ixx	3388.70	1283.10	2746.48	1899.22	None
16		Iyy	2426.00	6485.29	1554.25	4227.07	None
17		K _A	7.25	3.94	5.66	7.32	None

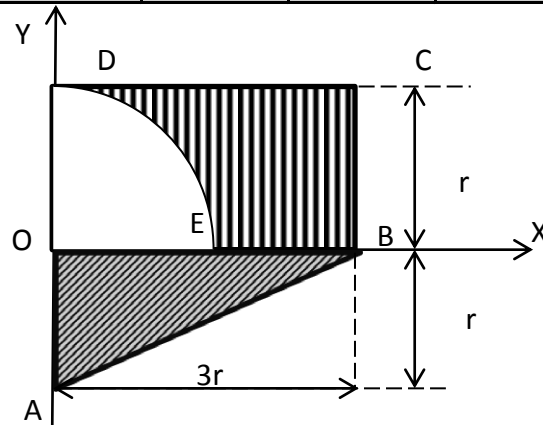
The Shown lamina is composed of a Square plate ABCD and a semicircular plate CFB with radius $r = 3.2 \text{ m}$ and a triangle plate ADE. The density of the lamina constant $\rho = 5.5 \text{ Kg/m}^2$. Given angle AED=60 degrees. Calculate the following.



			A	B	C	D	E
1	Rectangular Plate ABCD	Xcg	4.86	3.20	0.59	3.76	None
2		Ycg	5.17	3.20	4.32	2.31	None
3		Ixx	3075.80	1088.74	5028.48	5710.27	None

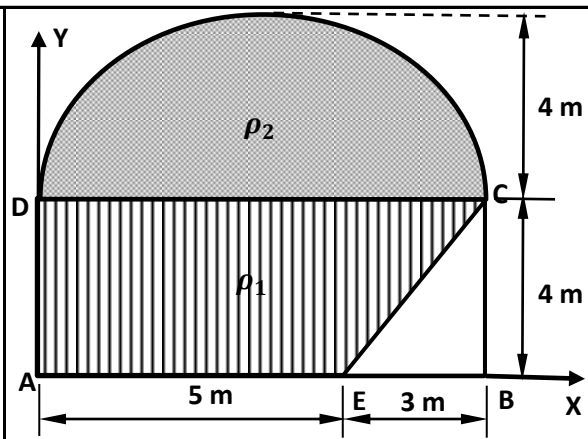
4		I _{yy}	4080.63	3075.80	5265.09	3276.91	None
7	Circular CFB	I _{xx}	1016.52	1132.38	2150.63	1061.06	None
8		I _{yy}	10480.06	8450.88	9875.69	5387.99	None
11		I _{xx}	325.56	104.82	90.13	444.00	None
12		I _{yy}	148.00	25.67	42.69	113.94	None
13	Total Lamina	X _{cg}	3.50	6.39	4.57	5.50	None
14		Y _{cg}	0.21	2.73	1.21	3.02	None
15		I _{xx}	6138.04	2225.39	4652.18	5899.22	None
16		I _{yy}	8612.00	14994.84	13321.71	2144.27	None
17		K _A	7.03	11.66	6.80	5.92	None

The Shown lamina is composed of a rectangular plate OBCD with density=2.4Kg/m², and a circular hole OED with radius r=4.2m and a triangle plate OAB with density=1.8Kg/m². Calculate the following.



			A	B	C	D	E
1	Rectangular Plate OBCD	X _{cg}	6.30	10.82	9.79	9.98	None
2		Y _{cg}	3.38	2.10	3.13	1.63	None
3		I _{xx}	1103.33	452.61	746.81	1380.02	None
4		I _{yy}	5751.05	769.35	4731.41	6721.26	None
5	Circular OED	X _{cg}	1.78	2.32	1.30	1.04	None
6		Y _{cg}	1.78	0.58	1.81	2.05	None
7		I _{xx}	-259.67	-146.64	-162.23	-234.73	None
8		I _{yy}	-118.91	-133.95	-15.23	-146.64	None
9	Triangular OAB	X _{cg}	4.15	1.94	4.20	7.30	None
10		Y _{cg}	-1.86	-0.93	-2.03	-1.40	None
11		I _{xx}	202.40	175.93	117.55	140.03	None
12		I _{yy}	250.82	2223.77	1152.96	1260.24	None
13	Total Lamina	X _{cg}	4.93	6.66	12.22	7.67	None
14		Y _{cg}	0.23	1.04	1.00	1.37	None
15		I _{xx}	404.23	524.01	740.20	1120.54	None
16		I _{yy}	8144.90	7396.23	6636.09	7834.87	None
17		K _O	11.14	5.71	0.74	7.79	None

The Shown lamina is composed of a rectangular plate 4*8m and a circular part. A triangle EBC is removed from rectangle. If $\rho_1 = 1 \text{ Kg/m}^2$ and $\rho_2 = 4 \text{ Kg/m}^2$. Calculate the following.



			A	B	C	D	E
1	Rectangular Plate ABCD	Xcg	4.00	7.99	2.41	6.30	None
2		Ycg	3.98	3.78	3.05	2.00	None
3		Ixx	251.73	170.67	323.83	321.47	None
4		Iyy	819.96	180.65	682.67	275.37	None
5	Circular	Xcg	3.71	4.00	5.56	5.78	None
6		Ycg	5.70	7.23	0.83	8.98	None
7		Ixx	6351.74	5832.53	3375.95	4423.65	None
8		Iyy	2010.62	909.84	1302.78	3984.79	None
9	Triangular EBC	Xcg	1.79	10.68	2.12	7.00	None
10		Ycg	0.39	1.33	0.21	1.78	None
11		Ixx	-7.52	-7.31	-16.00	-2.79	None
12		Iyy	-26.35	-21.71	-29.00	-44.53	None
13	Total Lamina	Xcg	3.08	1.03	6.13	3.86	None
14		Ycg	1.98	4.97	2.88	9.93	None
15		Ixx	3725.95	6213.75	6760.84	3530.62	None
16		Iyy	2396.29	1105.31	216.57	2759.76	None
17		K _A	9.32	5.76	7.31	6.84	None