

II B.Tech. I Semester Regular Examinations, November -2006
AIRCRAFT ENGINEERING DRAWING
(Aeronautical Engineering)

Time: 3 hours**Max Marks: 80**

1. Answer any two of the following: [2*20=40]

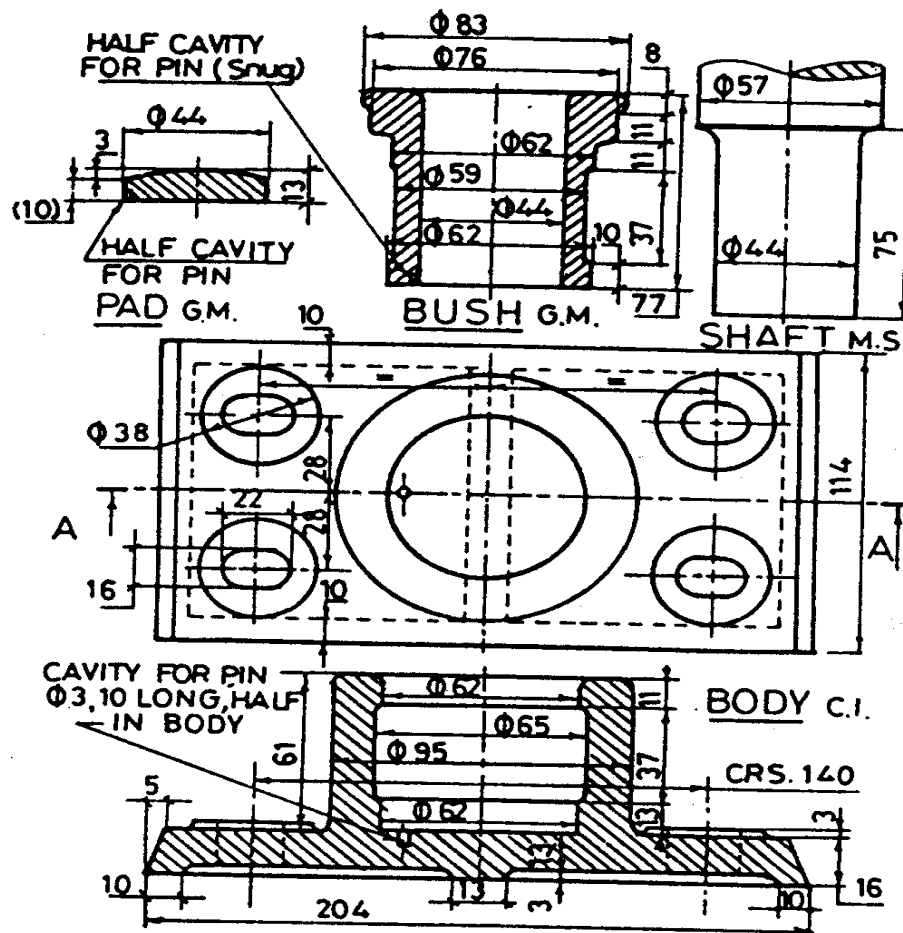
- (a) Draw a 2-d sectional profile of NACA 2410 from the data given below. Take airfoil chord of 25cws for your workout.

NACA 2410

(*Stations and ordinates given in percent of airfoil chord*)

Upper surface		Lower surface	
Station	Ordinate	Station	Ordinate
0	0	0	0
1.098	1.694	1.402	-1.448
2.297	2.411	2.703	-1.927
4.742	3.420	5.258	-2.482
7.217	4.169	7.783	-2.809
9.710	4.766	10.290	-3.016
14.722	5.665	15.278	-3.227
19.761	6.276	20.239	-3.276
24.814	6.668	25.186	-3.230
29.875	6.875	30.125	-3.125
40.000	6.837	40.000	-2.837
50.049	6.356	49.951	-2.468
60.085	5.580	59.915	-2.024
70.102	4.551	69.898	-1.551
80.097	3.296	79.903	-1.074
90.067	1.816	89.933	-0.594
95.041	0.990	94.959	-0.352
100.000	0.105	100.000	-0.105
L.E. radius: 1.10			
Slope of radius through L.E.:0.1			

- (b) Sketch a 2-row rivetted Lap joint. Show all dimensions in terms of rivet diameter 'd'.
- (c) Sketch a perspective view of an all metal stressed skin wing structure having 2 spar construction.
2. Given details of a Foot-Step bearing, draw the top and front sectional views, as shown in the figure 1 [40]



Details of a Foot-Step Bearing

Figure 1:

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1. Answer any two of the following: [2*20=40]

- (a) Draw a 2-d sectional profile of NACA 2412 airfoil from the data given below.
 Take the airfoil chord of 25cms for your drawing.

NACA 2412

(Stations and ordinates given in percent of airfoil chord)

Upper surface		Lower surface	
Station	Ordinate	Station	Ordinate
0	.....	0	0
1.25	2.15	1.25	-1.65
2.5	2.99	2.5	-2.27
5.0	4.13	5.0	-3.01
7.5	4.96	7.5	-3.46
10	5.63	10	-3.75
15	6.61	15	-4.10
20	7.26	20	-4.23
25	7.67	25	-4.22
30	7.88	30	-4.12
40	7.80	40	-3.80
50	7.24	50	-3.34
60	6.36	60	-2.76
70	5.18	70	-2.14
80	3.75	80	-1.50
90	2.08	90	-0.82
95	1.14	95	-0.48
100	(0.13)	100	(-0.13)
100	.....	100	0
L.E. radius: 1.58			
Slope of radius through L.E.:0.10			

- (b) Sketch a 2-row rivetted butt joint. Show all dimensions in terms of rivet diameter 'd'.
- (c) Sketch a perspective view of an all metal semi-monocoque fuselage.
2. Given details of a Crib and Cotter joint for square rods, draw the top and front sectional views as shown in the figure 2

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1. Answer any TWO of the following: [2*20=40]

- (a) Draw a 2-d sectional profile of NACA 2415 airfoil from the co-ordinates given below. Take airfoil chord of 25cms for your workout.

NACA 2415

(*Stations and ordinates given in percent of airfoil chord*)

Upper surface		Lower surface	
Station	Ordinate	Station	Ordinate
0	.....	0	0
1.25	2.71	1.25	-2.06
2.5	3.71	2.5	-2.86
5.0	5.07	5.0	-3.84
7.5	6.06	7.5	-4.47
10	6.83	10	-4.90
15	7.97	15	-5.42
20	8.70	20	-5.66
25	9.17	25	-5.70
30	9.38	30	-5.62
40	9.25	40	-5.25
50	8.57	50	-4.67
60	7.50	60	-3.90
70	6.10	70	-3.05
80	4.41	80	-2.15
90	2.45	90	-1.17
95	1.34	95	-0.68
100	(0.16)	100	(-0.16)
100	.....	100	0
L.E. radius: 2.48			
Slope of radius through L.E.:0.10			

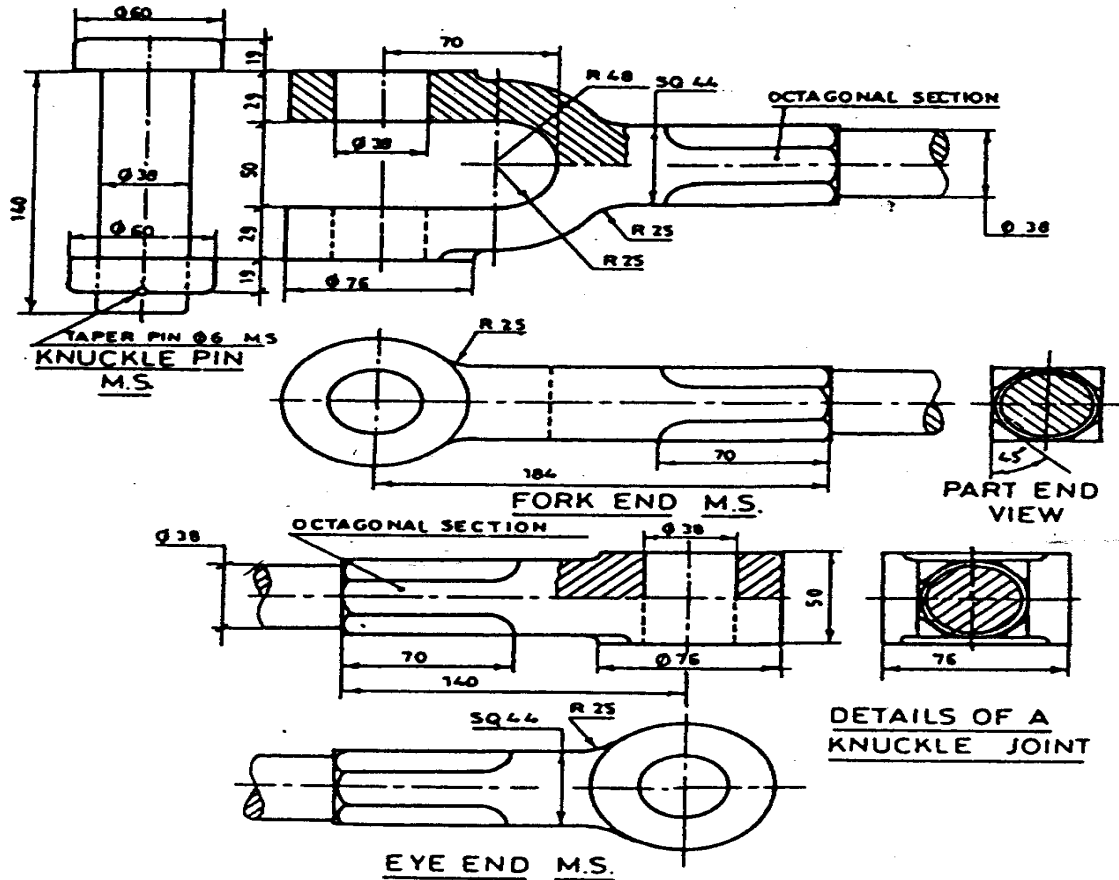
- (b) Sketch welded tube assembly of the empennage (Hor.tail + Vert.tail) of a light airplane.
- (c) Sketch front and side views of the seating arrangements for a wide-bodied long distance Jetliner with 3-4-3, 2 aisles as per suggested dimensions.
- Seat width 500 mm
- Seat pitch 850 mm

Aisle width 430 mm

Aisle height 2.30 m.

Can you estimate the diameter of the circular fuselage.

2. Given details of a Knuckle joint, draw top and front sectional views. (figure3) [40]



Knuckle Joint (Detail drawings)

Figure 3:

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1. Answer any TWO of the following: [2*20=40]

- (a) Draw a 2-d sectional profile of NACA 2408 airfoil from the Co-ordinates provided below. Take airfoil chord of 25cm for your workout.

NACA 2408

(Stations and ordinates given in percent of airfoil chord)

Upper surface		Lower surface	
Station	Ordinate	Station	Ordinate
0	0	0	0
1.128	1.380	1.372	-1.134
2.337	1.977	2.663	-1.493
4.794	2.829	5.206	-1.891
7.273	3.471	7.727	-2.111
9.768	3.987	10.232	-2.237
14.778	4.776	15.222	-2.338
19.809	5.320	20.191	-2.320
24.852	5.677	25.148	-2.239
29.900	5.875	30.100	-2.125
40.000	5.869	40.000	-1.869
50.039	5.473	49.961	-1.585
60.068	4.820	59.932	-1.264
70.081	3.942	69.919	-0.942
80.078	2.858	79.922	-0.636
90.054	1.575	89.946	-0.353
95.033	0.855	94.967	-0.217
100.000	0.084	100.000	-0.084
L.E. radius: 0.70			
Slope of radius through L.E.:0.1			

- (b) Sketch a 2-row rivetted butt joint. Show all dimensions in terms of rivet diameter 'd'.
- (c) Sketch a typical welded tube fuselage structure for a light weight 4 seater airplane.
2. Given details of a Wall bracket, draw top and side sectional views shown in the figure 4

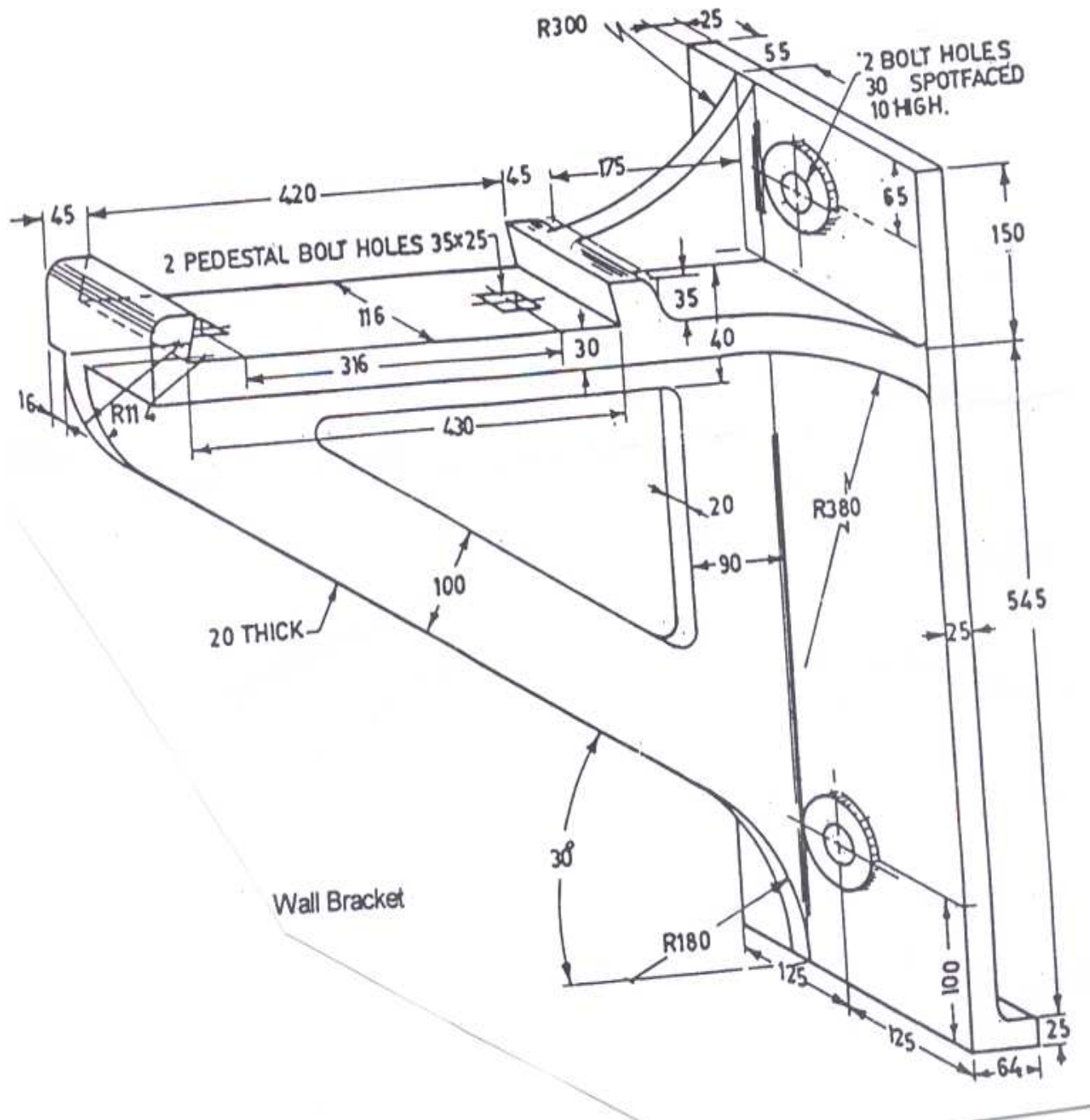


Figure 4:

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