

Course title: Computer programming

Answer ALL QUESTIONS

Question One: (10 Marks)

What is the result if you execute the following statements in Matlab Command Window?

No	Command entered (one by one)	What I see in Matlab window(s)	
		Command window	Workspace
1	%% Matlab Final Exam		
2	A = [3 2]		
3	B = 3*A;		
4	C = [A;B]		
5	C(4)		
6	C = [1;2;3;4;5];		
7	d=C.^2;		
8	z=A + d		
9	y=A + B		
10	cos = 5;		
11	y = cos(pi)		
12	clear		
13	z = cos(pi)		
14	cftool		
15	plot(x,y, 'r-o')		
16	x=1; if x==1;then y=0;end		
17	help sin		
18	xlabel('Population');		
19	s = cell(1,2)		
20	End of Q1		

Question Two: (14 Marks)

a) In the problem shown in Figure 1, each element is 4 m long. Construct the matrix you would solve to find the forces in the elements. Use the element and node numbering shown in the figure. (7 marks)

b) Write a Matlab script to estimate the columns dimensions (Fig. 2). Also estimate the number of bars in each column. (assume square sections). (7 marks)

-Area of concrete = Load×1000/65.84

-No. of bars = 0.005 × Area of the concrete

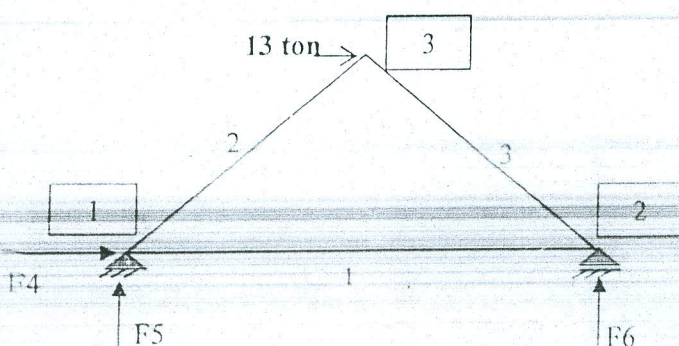


Fig. 1

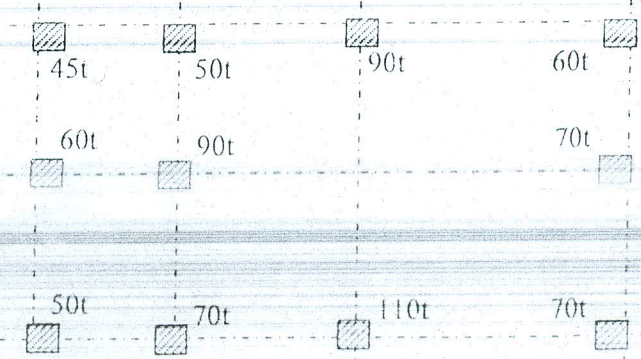


Fig. 2

Question Three: (14 Marks)

- Write a Matlab function (**beam**) to draw the bending moment for a simple beam (Fig. 3) with span $L1$ subjected to concentrated load P at distance $L2$ from the left support. (7 marks)
- How to Build a Matlab Graphical User Interface (**Beam**) shown in figure 4 to execute the function (**beam1- Question II.a**). (7 marks)

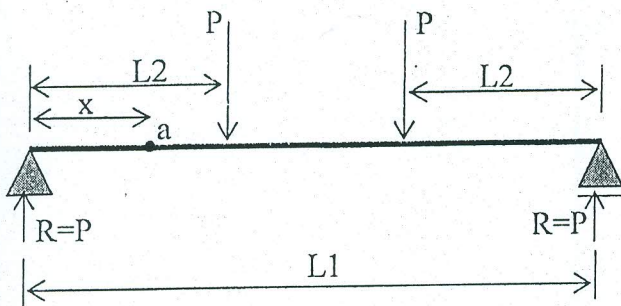


Fig. 3

Hint. $M_a = P \cdot x$

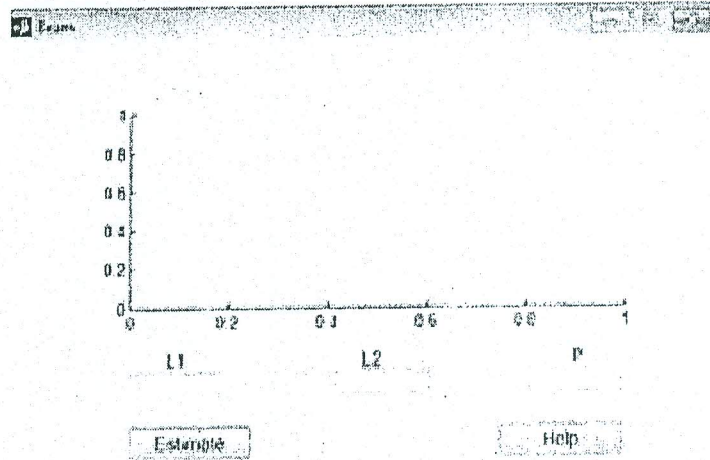


Fig. 4

Question Four: (12 Marks)

- Write a Matlab script to find the minimum perimeter of the fenced enclosure consists of a rectangle of length L and width $2R$, and a semicircle of radius R , as shown in Figure 5. The enclosure is to be built to have an area A of 1100 m^2 and the cost of the fence is L.E. 900/m. (6 marks)

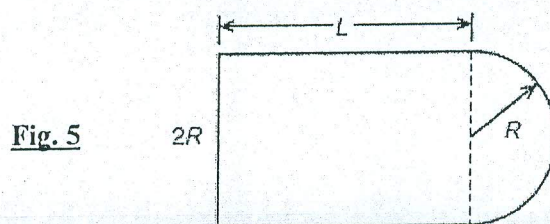


Fig. 5

- A part of the results of the Brass tensile test are as follows: (6 marks)

Force (lb.)	0	39	66	99	132	173	220
Displacement (in)	0	0.001	0.002	0.003	0.004	0.005	0.006

It is required to:

- Obtain a function that describes these data.
- Plot the function and the data on the same plot (change the line color to red and the line style to dotted). Set the label of the axis x as 'Force (lb)' and the axis y as 'Displacement (in)'.