



MASS OF BEAM MAY BE
CONSIDERED NEGLIGIBLE.

BEAM MATERIAL IS ALUMINUM
 $E = 80000 \text{ N/MM}^2 \text{ (MPa)}$

DETERMINE THE FOLLOWING FOR THIS SYSTEM; BASED ON
THE TABULATED DATA BELOW (pg 2)

a) EQUATIONS OF MOTION, IN MATRIX FORM

DO THE FOLLOWING FOR AN UNDAMPED ($c_1 = c_2 = 0$), UNLOADED ($F=0$),
SYSTEM WITH THE TABULATED INITIAL CONDITIONS

- FIND \vec{X} EQUATIONS, USING MODAL ANALYSIS
- FIND \vec{X} USING NUMERICAL METHODS.
- COMPARE b) AND c) RESULTS BY PLOTTING

DO THE FOLLOWING FOR AN UNDAMPED, LOADED SYSTEM, INITIAL
CONDITIONS ARE $\vec{X}(0) = \dot{\vec{X}}(0) = 0$

- FIND \vec{X} USING MODAL ANALYSIS
- FIND \vec{X} USING NUMERICAL METHODS
- COMPARE e) AND f) RESULTS BY PLOTTING

DO THE FOLLOWING FOR A DAMPED, LOADED SYSTEM. INITIAL
CONDITIONS ARE $\vec{X}(0) = \dot{\vec{X}}(0) = 0$

- FIND \vec{X} USING NUMERICAL METHODS

	6TH DIGIT OF STUDENT ID				
	1, 2	3, 4	5, 6	7, 8	9, 0
M_1 (kg)	5	25	4	28	50
K_1 (N/mm)	15	30	25	90	200
C_1 (Ns/m)	20	50	30	120	300
M_2 (kg)	10	20	5	55	90
BEAM INTERNAL DAMPING C_2 (Ns/m)	10	25	5	40	75
L (mm)	500	800	280	2000	3500
b (mm)	20	40	15	100	100
t (mm)	6	10	5	30	60
F (N)	$9 \cos 8t$	$22 \cos 12t$	$8 \cos 20t$	$90 \cos 15t$	$120 \cos 23t$
$x_1(0)$ (mm)	15	8	0	23	0
$x_2(0)$ (mm)	0	0	0	-10	20
$\dot{x}_1(0)$ m/s	.2	0	.4	0	.32
$\dot{x}_2(0)$ m/s	0	.3	.2	0	0