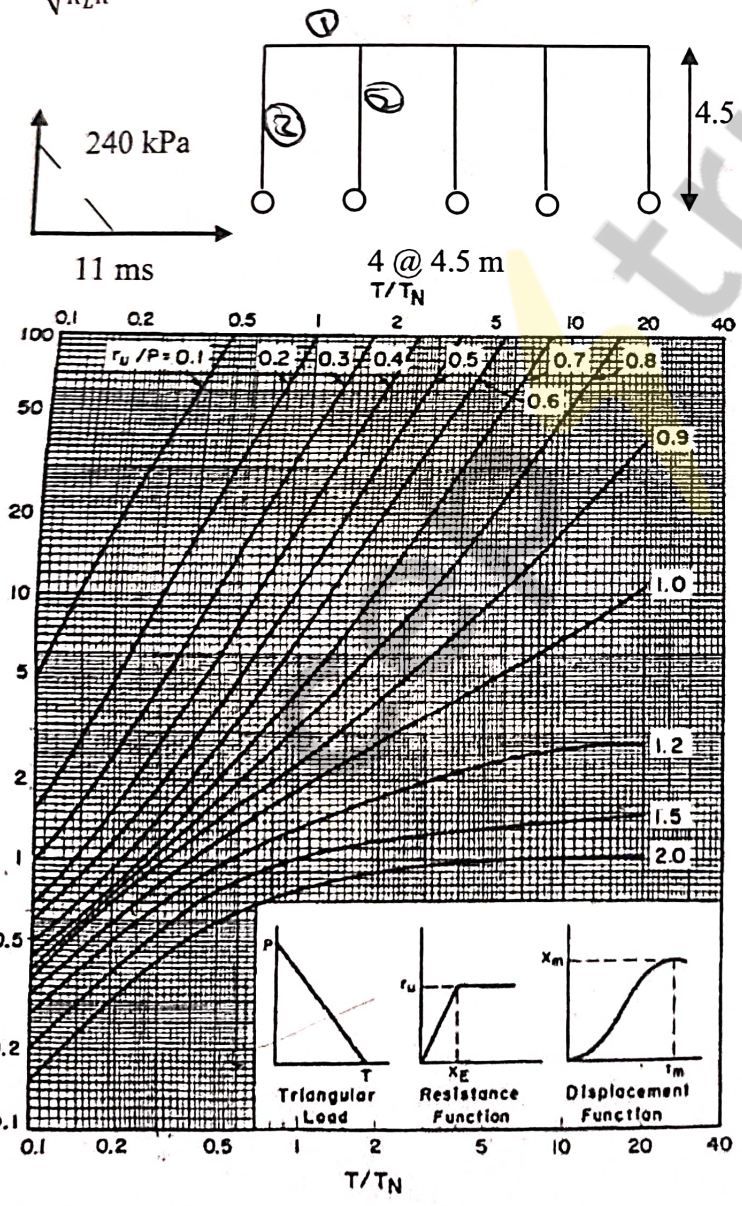
CE 616 End Term

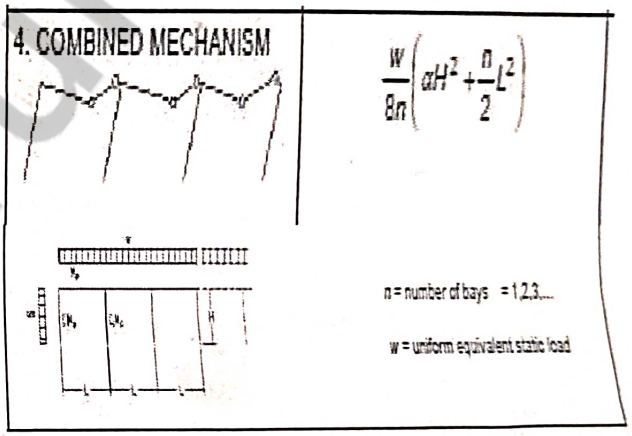
Instructions

1) Read the instructions carefully and sign the answer sheet. **2) No pencil no credit policy will be followed.** 3) Draw properly labeled section details and use a straight-edge. 4) Use the units given in the problem. Do not change from SI units to US Customary Units and Vice Versa. 5) Present your solutions in a clear, legible and logical manner. 6) Use the conventional units. 7) Assume data if not provided in the problem. 8) This is a closed book, closed notes exam. So no material is allowed except the question paper and the answer sheet provided. **9) Any form of plagiarism will earn a credit of F in the course.**

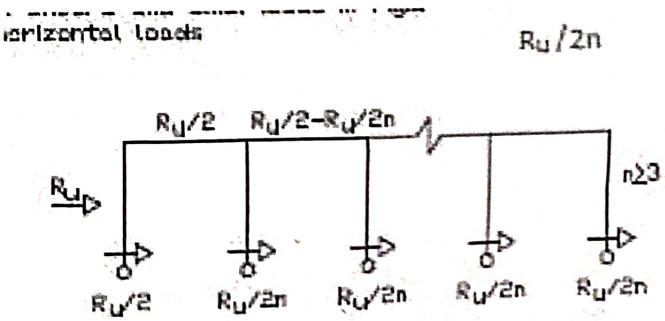
Question 1: Design a simply supported RC wall to resist the blast load such that **the maximum deflection is less than three times the maximum dynamic elastic deflection**.. L= 4.5 m, H= 3.5 m. $D = \frac{E_C I_a}{1-\nu^2}$

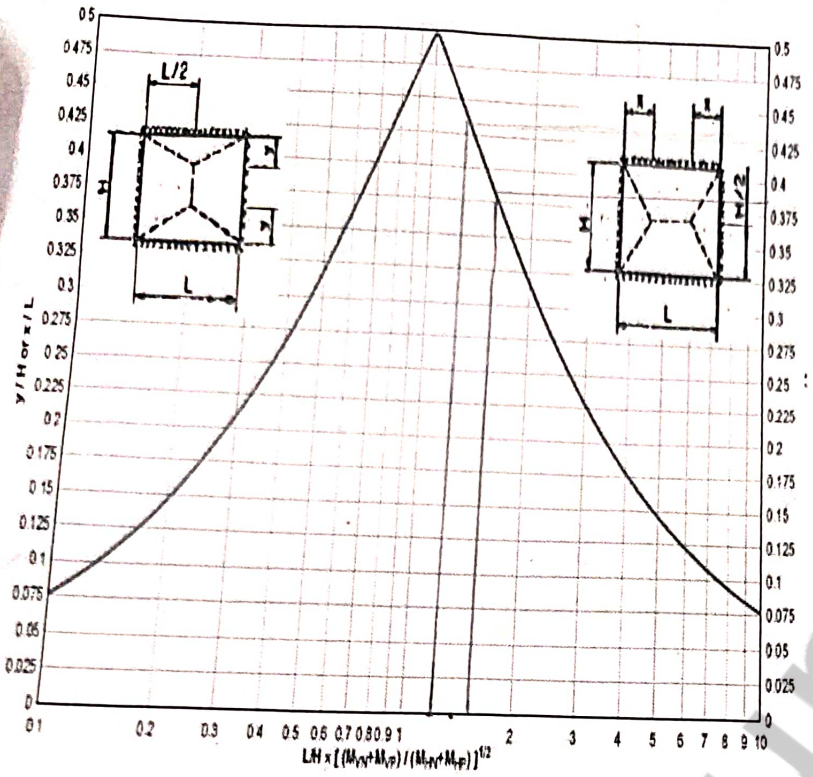
Question 2: Design a four-bay, single story, pinned-base rigid frame to resist the blast load made of **STEEL**. Deformation limit is H/50 and rotation not more than 1^0 for individual members. b_v=b_h=5 m, $K_L = 0.55(1-.25\beta)$, C=3.5; C_1=2.0; C_2=4.65; Roof is made of steel with thickness of 30 mm; $T_N = 2\pi\sqrt{\frac{M_E}{K_L K}}$





* For C_1 = 2 hinges form in the girders and columns at interior joints



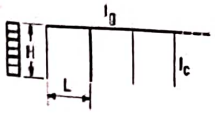


STIFFNESS FACTOR $K = \frac{EI_{ca}}{H^2} \times C_2 \times [1 + (0.7 - 0.1\beta)(n-1)]$

n = NUMBER OF BAYS

β = BASE FIXITY FACTOR **

$D = \frac{I_g / L}{I_{ca}(0.75 + 0.25\beta)/H}$



I_{ca} = AVERAGE COLUMN MOMENT OF INERTIA = $\sum I_c / (n-1)$

D	C_2		
	$\beta = 1.0$	$\beta = 0.5$*	$\beta = 0$
0.25	26.7	14.9	3.06
0.50	32.0	17.8	4.65
1.00	37.3	20.6	6.04

* Values of C_2 are approximate for this β

** β = 1.0 for fixed base

= 0.0 for hinged base

where:

E = modulus of elasticity (psi)
Ica, Ig, Ic = moment of inertia (in.4)
H = height (feet)
L = bay length (feet)