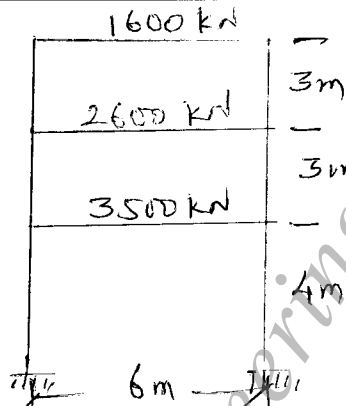


- Q. 4 a) What is 'PGA'? How it is determined? (04)
 b) Write the steps involved in determination of earthquake forces using 'Modal Analysis'? How the numbers of modes to be considered are decided? (06)

OR

- Q.4 For the frame shown in figure, determine the design seismic forces using dynamic method of analysis. Draw the lateral force and the storey shear diagram. The base shear as determined by static method is 470 kN. (10)
 Given : $Z = 0.24$, $I = 1.5$, $R = 5$.
 The building is founded on medium stiff soil.
 The details of mode shapes are as follows:

Floor Level	Mode 1 $T = 0.43 \text{ sec}$	Mode 2 $T = 0.24 \text{ sec}$	Mode 3 $T = 0.13 \text{ sec}$
3	1.0	1.0	1.0
2	0.63	-0.6	-2.25
1	0.27	-0.71	2.3

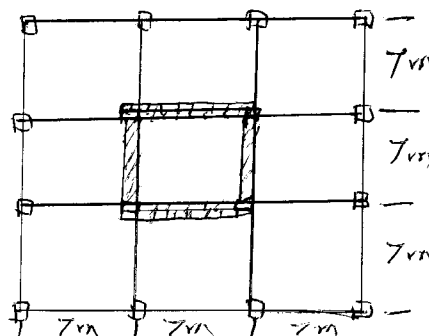


- Q. 5 a) How a shear wall contributes to increase the ductility of a building? Justify your answer with relevant figure. (04)
 b) With the help of deflected shape of a shear wall, explain the various types of reinforcements provided in it, their location and function. (06)

OR

- Q.5 Design a shear wall for a 5 storied building having the plan as shown. (10)
 Floor to floor height is 3.2 m. The seismic lateral forces at each floor level are as follows. Use M25, Fe 500.

Floor Level	5	4	3	2	1
Lateral Force in kN	640	500	350	260	130



- Q. 6 a) How a building can be made more ductile for resisting the earthquake? (05)
 b) What do you mean by vertical irregularities? How they can be avoided? (05)

OR

- Q. 6 a) What is a Weak beam- Strong Column Concept? How it helps in reducing the effect of earthquake on buildings? (05)
 b) What is a special confining reinforcement in columns? Why and how it is provided? (05)

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