

Day : Tuesday
Date : 13/11/2018

W-2018-2609

Time : 02.30 PM TO 05.30 PM
Max. Marks : 60

N. B. :

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Draw neat and labeled diagram **WHEREVER** necessary.
- 4) Assume suitable data, if necessary.
- 5) Use of I. S. 1893 Part – I, I. S. 13920, I. S. 456 is allowed.

Q. 1 a) Define magnitude and intensity of an earthquake and differentiate between them. (05)

b) What are the effects of earthquake on buildings? (05)

OR

Q.1 a) What do you understand by "Plate Tectonics"? How it causes earthquake? (05)

b) Discuss briefly the seismic zones and the need of seismic zoning. (05)

Q. 2 a) Define Static load and Dynamic load. Differentiate between them (05)

b) What do you understand by SDOF? What are its types? (05)

OR

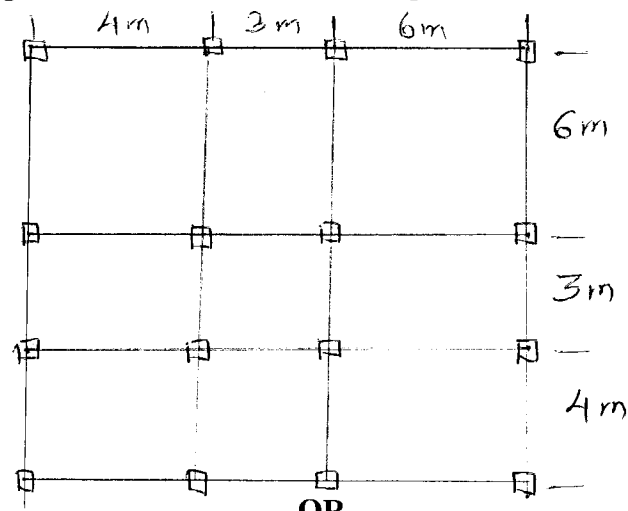
Q.2 a) What is damping? How any earthquake resistant building can be provided with more damping effect? (05)

b) What are the different types of vibrations? Explain with suitable examples. (05)

Q.3 Determine the lateral forces at different storey levels for a plan of a four storied school building located at Allahabad as shown in figure. (10)
Dead Load = 5 kN/m^2 , Live Load = 4 kN/m^2 on each floor and
Live Load = 1.5 kN/m^2 on roof. Sizes of beams and columns = $300\text{mm} \times 600 \text{ mm}$.

Storey height = 3.5 m.

The building is founded on hard soil and is provided with brick masonry.



Q. 3 a) State the assumptions made in the analysis of earthquake resistant design of buildings using static method. (04)

b) What is the philosophy behind earthquake resistant design of structures based on DBE?? What are the factors that affect the values of earthquake force? (06)

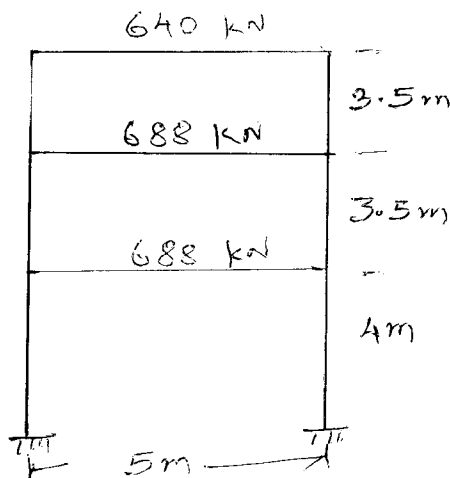
P. T. O.

- Q.4 a) Describe how the choice of method of earthquake analysis is decided. (04)
 b) What do you understand by 'Response Spectra'? How it is determined? (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 280 kN. (10)
 Given : $Z = 0.36$, $I = 1.5$, $R = 5$.
 The building is founded on medium stiff soil.
 The free vibration properties of the frame are as follows:

Floor Level	Mode 1 $T = 0.134\text{sec}$	Mode 2 $T = 0.191\text{ sec}$	Mode 3 $T = 0.533\text{sec}$
3	1.0	1.0	1.0
2	-2.04	-0.49	-0.81
1	1.61	1.22	0.45



- Q.5 a) What is the concept of a shear wall in earthquake resistant design? (04)
 b) What are the requirements in the design of a shear wall? Explain how it is designed as a member subjected to axial compression and bending. (06)

OR

- Q.5 Design a shear wall of length 7 m and thickness 220 mm subjected to following forces. Use M25, Fe415 (10)

Loading	Axial Force (kN)	Moment (kNm)	Shear force (kN)
DL+IL	2000	610	40
EL	400	4300	460

- Q.6 a) What are the general provisions to be followed for columns in earthquake resistant design? (05)
 b) Draw a typical beam- column junction for a building with earthquake resistant design. (05)

OR

- Q.6 a) Name the different types of irregularities in buildings and explain any one type in detail. (05)
 b) What are the principles of earthquake resistant design of R.C. buildings? (05)

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