

Code No: **R41015****R10****Set No. 1****IV B.Tech I Semester Supplementary Examinations, February/March - 2018****EARTHQUAKE RESISTANT DESIGN****(Civil Engineering)****Time: 3 hours****Max. Marks: 75****Answer any FIVE Questions****All Questions carry equal marks****The Use of Relevant IS Codes is Permitted. Assume any suitable data if found necessary.**

- 1 a) Distinguish between an earthquake magnitude and intensity and also explain the different earthquake magnitude scales and MMI scale. [8]
b) Explain the elastic rebound theory. [4]
c) Explain the classification of earthquakes. [3]
- 2 a) Derive an expression for the response of an undamped SDOF system of mass ' m ' and stiffness ' k ' subjected to sinusoidal force of $F_o \sin \beta t$. [8]
b) Explain the following:
(i) Continuous system and lumped system
(ii) Critical damping coefficient and
(iii) Response spectrum [7]
- 3 a) Draw the mode shapes of a building frame shown in Figure. 3 (a)

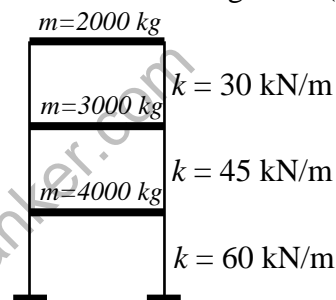


Figure 3 (a)

- b) Explain the mode superposition method of obtaining the response of multi-degree freedom system. [10] [5]
- 4 a) Derive equations of motion for Two-degrees of damped system subjected forced vibrations. [5]
b) Explain the application of response spectra. [10]
- 5 a) Explain the various methods of prevention of twisting of a building during an earthquake. [5]

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- b) Determine the design seismic load on each frame of a five-storeyed reinforced concrete telephone exchange building located in Vijayawadal, the plan is as shown in Figure 5 (b). The soil condition is medium soil. The reinforced concrete frames are filled with brick masonry and the height of each storey is 3.6 m . The lumped weight due to dead load is 1 kN/sqm on floors and 2 kN/sqm on roof. The live load on the floors is 3 kN/sqm and 2 kN/sqm on roof.

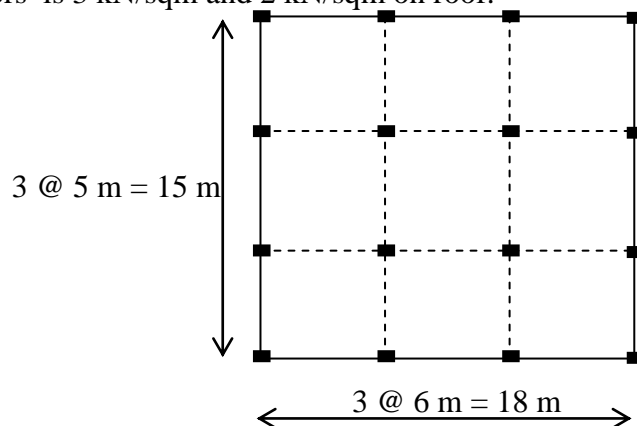


Figure 5 (b)

[10]

- 6 a) Explain the various parameters influencing the ductility of RC structural components. [6]
b) Draw the ductile detailing provisions of beams of an RC building as per the IS code of practice and also explain the salient features. [9]
- 7 a) Explain the influence of various types of plan configurations of reinforced concrete buildings affecting the performance of reinforced concrete buildings during earthquakes. [8]
b) Explain, with suitable examples, the effect of discontinuities in load path affecting the performance of RC buildings during earthquakes. [7]

- 8 A shear wall of length 6 m and thickness 300 mm is subjected to the forces as given below:

Type of Load	Axial force (kN)	Moment (kNm)	Shear force (kN)
DL+LL	2100	600	50
Earthquake Load	500	6000	900

Design the shear wall using M30 grade of concrete and Fe415 steel and detail as per IS: 13920.

[15]