IV B.Tech I Semester Supplementary Examinations, February/March - 2018 EARTHQUAKE RESISTANT DESIGN (Civil Engineering)						
Ti	ime: 3	3 hours Max. Marks: 75	arks: 75			
		Answer any FIVE Questions				
		All Questions carry equal marks	Examinations, February/March - 2018 SISTANT DESIGN (ineering) Max. Marks: 75 VE Questions rry equal marks assume any suitable data if found necessary. *** magnitude and intensity and also explain the as and MMI scale. [8] (4] tkes. [3] Se of an undamped SDOF system of mass ' $m$ ' dal force of $F_o \sin \beta t$ . [8]			
	The U	se of Relevant IS Codes is Permitted. Assume any suitable data if found necessary. *****	he [8] [4] [3] n' [8]			
1	a) b)	Distinguish between an earthquake magnitude and intensity and also explain the different earthquake magnitude scales and MMI scale. Explain the elastic rebound theory. Explain the classification of earthquakes	[8] [4] [3]			
	()	Explain the classification of cartiquakes.	[5]			
2	a) b)	Derive an expression for the response of an undamped SDOF system of mass 'm' and stiffness 'k' subjected to sinusoidal force of $F_o \sin \beta t$ . Explain the following:	[8]			

- (i) Continuous system and lumped system
- (ii) Critical damping coefficient and
- (iii) Response spectrum
- Draw the mode shapes of a building frame shown in Figure. 3 (a) 3 a) m=2000 kg

$$m=3000 kg$$

$$k = 30 kN/m$$

$$k = 45 kN/m$$

$$k = 60 kN/m$$
Figure 3 (a)

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

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### Set No. 1 **R10**

[7]

[10]

# **R10**

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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]

[8]

[7]

[15]

- 6 a) Explain the various parameters influencing the ductility of RC structural components.
  - 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.
  - b) Explain, with suitable examples, the effect of discontinuities in load path affecting the performance of RC buildings during earthquakes.
- 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.

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