

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER-VII (NEW) EXAMINATION – WINTER 2020

Subject Code: 2170612

Date: 19/01/2021

Subject Name: Earthquake Engineering

Time: 10:30 AM TO 12:30 PM

Total Marks: 56

Instructions:

1. Attempt any FOUR questions out of EIGHT questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. IS 1893, IS 13920, IS 4326 are permitted in examination hall.

		MARKS
Q.1	(a) Define tectonic plate. Discuss plate tectonic theory.	03
	(b) Explain liquefaction in detail	04
	(c) Derive expression for the response of free damped SDOF structural system.	07
Q.2	(a) Define/Explain the terms mentioned. 1) Epicenter 2) Intensity 3) Magnitude,	03
	(b) What is meant by over damped, critically damped and under damped system?	04
	(c) Discuss in detail the advantage of horizontal bands and vertical reinforcement in the masonry buildings.	07
Q.3	(a) Discuss in detail advantage of horizontal bands in the masonry building.	03
	(b) Write short note on response spectrum.	04
	(c) Find the natural frequency of the system shown in fig. 1.	07
Q.4	(a) Enlist various irregularities found in civil engineering structures for earthquake point of view.	03
	(b) Explain following terms. 1) Base shear 2) Seismograph 3) Confinement Reinforcement 4) soft storey.	04
	(c) What is mode shape? Plot the mode shapes for the frame shown in figure 2. Take $EI_{column} = 1.5 \times 10^{12} \text{ Nmm}$, $EI_{beam} = \infty$.	07
Q.5	(a) Explain column jaketing.	03
	(b) Give various methods of improving the ductility of structures.	04
	(c) Explain Repair, restoration and retrofitting.	07
Q.6	(a) Enlist various codes of practice along with correct name related to earthquake engineering.	03
	(b) Explain mathematical model in detail. Draw mathematical model for two structural system.	04
	(c) Explain Base isolation technique in detail.	07

- (a) Explain philosophy of earthquake resistant design. Give four virtue of good earthquake resistant design. 03
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- (b) Differentiate static DOF and dynamic DOF. 04
- (c) Discuss the capacity design concept in ductile detailing. 07

- Q.8** (a) Differentiate 1. Magnitude & Intensity 2. S waves & Love Waves 03
- (b) Sketch the reinforcement details for c/s of RCC column 400 x 400 mm , 04
 having 8 nos. 20 mm dia. main bars as ductile requirement
- (c) Discuss in detail the concepts of the ductile detailing in Beams. 07

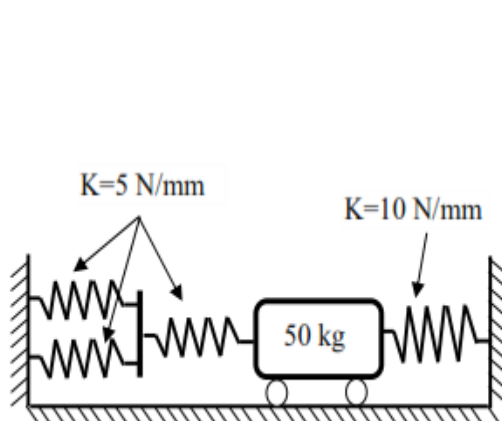


Fig 1.

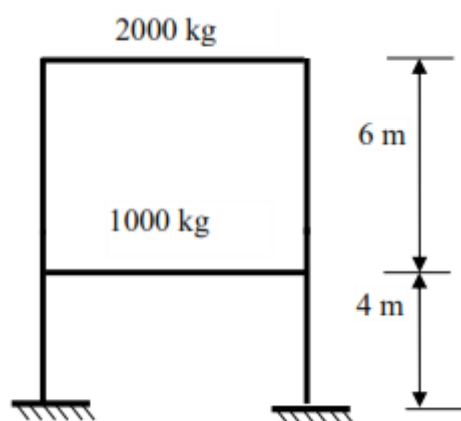


Fig 2.