Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER– I (OLD course)• EXAMINATION – SUMMER 2015

Subject Code: 711502 **Date: 12/05/2015**

Subject Name: Structural Dynamics and Earthquake Engineering

Time: 10:30 am to 1:00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Use of IS 1893, IS 13920, IS 4326, SP 16 are permitted.**
5. **Draw neat and clean figures whenever required.**

Q.1	**(a)**	Justify with reasons: (1) Open ground story is not preferred. (2) Short column is not preferred.	**07**
	(b)	Explain causes and remedial measures of liquefaction.	**07**
Q.2	**(a)**	Elaborate: Base Isolators and Seismic Dampers	**07**
	(b)	Explain Earthquake ground motion characteristics.	**07**
		OR	
	(b)	Explain the behavior of masonry building under earthquake forces with neat sketches.	**07**
Q.3		Calculate base shear for the 7-story R.C. frame building for residential building located in Earthquake Zone IV, using seismic coefficient method for the following data. 1. No. of bays in X ï direction - 6 and No. of bays in Y ï direction - 6 2. Bay width in both direction - 4 m and Story height - 3.2 m 3. Thickness of Slab - 130 mm and Size of Beam - 230 mm x 500 mm 4. Size of Column - 300 mm x 500 mm and Internal wall thickness - 115 mm 5. Internal wall thickness - 230 mm and Live Load ï 3.5 kN/m^2	**14**
		OR	
Q.3	**(a)**	Elaborate the important features of ANSYS software. How this will differentiate with STAAD software?	**07**
	(b)	Differentiate clearly with example about static and dynamic analysis of structures.	**07**
Q.4	**(a)**	Write in short about intensity and magnitude of earthquake.	**07**
	(b)	Write in short about the analysis of structure by response spectrum theory.	**07**
		OR	
Q.4	**(a)**	Derive the equation and find the solution for force damped system.	**10**
	(b)	Explain critically damped system.	**04**
Q.5	**(a)**	A simply supported beam is having a span of 10m, damping ratio 0.056 and is having flexural rigidity 20000kN-m^2. A pump of weight 15kN is placed at the center of beam. The unbalanced mass 120kg rotates at 2200rpm at an eccentricity of 140mm. Derive the equation of steady state condition from the basic differential equation.	**10**
	(b)	Explain strong column weak beam concept.	**04**
		OR	

Q.5	**(a)**	A single spring has 1500kg mass, spring constant 1.5 x 10^6 N/m and viscous damper constant of 4000 N-sec/m. This spring mass system is having initial displacement and velocity of 0.013m and 2.2m/sec. Derive the response of the mass from the basic fundamentals. Calculate the time required to reduce the initial amplitude to 5% of the original amplitude.	**10**
	(b)	Explain on Duhamelôs integral.	**04**

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