PRN:		Course Code:	CET 402

Final Year B. Tech End Semester Examination Summer 2023

Earthquake Engineering

Day and Date: wednesday, 14/06/2023 Max Marks: **100**

Time: 2.00 to 5.00 PM Duration: **03** hrs

Instructions: All questions are compulsory.
IS: 1893:2016 and IS 13920 are allowed

			Marks	Bloom's Level	CO
Q.1		**Attempt the following**			
	a)	Discuss 1) Plate tectonic Theory 2) Elastic Rebound Theory	08	L1	CO 1
	b)	Discuss in detail on major earthquakes in India.	08	L1	CO 1
		OR			
	b)	Differentiate between body wave and surface wave and explain the characteristics of these waves	08	L1	CO 1
Q.2		**Attempt the following**			
	a)	Derive the equation of motion and its solution for free Undamped vibration system.	08	L2	CO 2
	b)	An SDOF system of mass 'm' and stiffness 'k' is to be found to vibrate with a natural frequency of 12 Hz. If the stiffness is decreased by 1000 N/m , the natural frequency is altered by 50%. Determine mass and stiffness for the original system.	08	L2	CO 2
		OR			
	b)	A dynamic system has maximum velocity 200 mm/s and natural period is 1 sec. If the initial displacement is 10 mm, determine the amplitude and the initial velocity.	08	L2	CO 2
Q.3		**Attempt any two from the following**			
	a)	Derive the displacement transmissibility ratio from equation of motion.	08	L2	CO 2
	b)	In an experiment to determine the damping characteristics of a system, a viscously damped mass of 4 kg undergoes resonant amplitude of 1.30 m with a period of 0.35 sec, when subjected to a harmonically excited force of 270.25 N. Determine the damping coefficient.	08	L2	CO 2
	c)	What do you understand by Dynamic Magnification factors?	08	L2	CO 2
Q.4		**Attempt any One from the following**			

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a)	Calculate base shear for BSNL office in Karad with following data by seismic coefficient method. (a) No. of storey = 4 (b) No. of bay in x direction = 3 (c) No. of bay in y direction = 3 (d) storey height = 3 m (e) Width of each bay = 5 m (f) Total DL on roof = 12 kN/m^2 (g) Total DL on floor = 10 kN/m^2 (h) LL = 4 kN/m^2 (i) Thickness of slab = 120 mm Neglect weight of infill walls. Assume suitable data if required.	16	L3	CO 3
b)	A 4-story building is to be constructed in the area of seismic zone III having medium soil. The dimension of the building is 9m × 18 m. The height of each story is 3.2 m. The live and dead load on each floor is 3 kN/m^2 and 6 kN/m^2, respectively. The live and dead load on the roof is 2 kN/m^2 and 4 kN /m^2, respectively. Take importance factor as 2 and response reduction factor as 3. Determine the seismic shear force in each story as per IS: 1893 (Part 1)-2002.	16	L3	CO 3
Q.5	**Attempt any Two of the following**			
a)	Write a short note on 'effect of discontinuity in load path'.	09	L4	CO 4
b)	Explain the codal provision regarding, thickness, reinforcement provision and location of shear wall. What is the ill effect, if the sear wall is not properly placed?	09	L5	CO 4
c)	Interpret four virtue of good earthquake resistant design.	09	L4	CO 4
Q.6	**Attempt any Two of the following**			
a)	Explain Tuned Mass Dampers with neat sketch.	09	L3	CO 4
b)	Explain in details concept of friction Pendulum Bearings.	09	L3	CO 4
c)	Explain Stud wall construction.	09	L3	CO 4

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