PRN:		Course Code:	CET2702

Final Year B. Tech End Semester Examination Winter 2024

Earthquake Engineering 000152

Day and Date: Mon 25 NOV 2024 Max Marks: **100**

Time: 10:30AM To 01:30PM 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)	Explain in detail earth structure.	08	L1	CO 1
	b)	Differentiate between body wave and surface waves.	08	L1	CO 1
		OR			
	b)	Discuss major tectonic plates.	08	L1	CO 1
Q.2		**Attempt the following**			
	a)	Derive the equation of motion and its solution for free damped vibration system.	08	L2	CO 2
	b)	A dynamic system has maximum velocity 200 mm/s and natural period 1 sec. If the initial displacement is 10 mm, determine the amplitude and the initial velocity.	08	L2	CO 2
		OR			
	b)	Explain multiple elastic forces in series and in parallel. Derive expression for the equivalent stiffness in each case.	08	L2	CO 2
Q.3		**Attempt any two from the following**			
	a)	Derive the expression for the force transmitted to the foundation in a damped SDOF due to harmonic force $F(t)= F_0 \sin \omega t$	08	L2	CO 2
	b)	Explain phenomena of resonance.	08	L2	CO 2
	c)	Discuss Dynamic Magnification factors.	08	L2	CO 2
Q.4		**Attempt any One from the following**			
	a)	Plan and elevation of a four-storey reinforced concrete office building is shown in Fig 1. The details of the building are as follows. Number of Storey = 4, Zone III, Live Load = 3 kN/m², Columns 450 x 450 mm, Beams=250 x 400 mm, Thickness of Slab = 150 mm, Thickness of Wall 120 mm, Importance factor = 1.0,	16	L3	CO 3

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Structure type = OMRF Building Determine design seismic lateral load and storey shear force distribution.

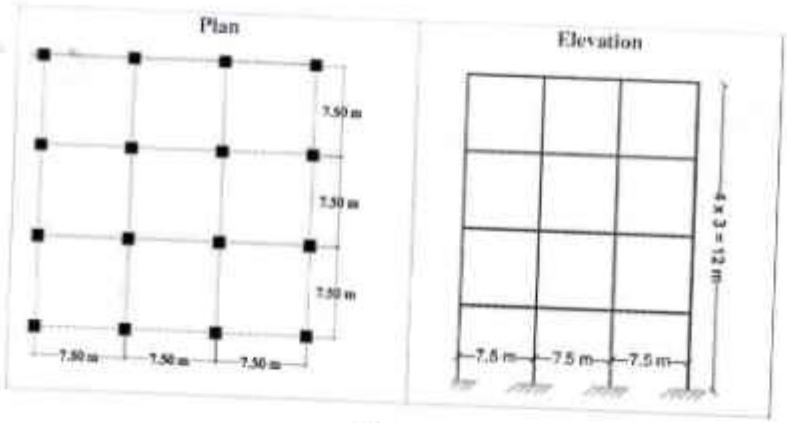


Fig 1.

	b)	A 4-story building is to be constructed in the area of seismic zone II having medium soil. The dimension of the building is 10m × 20m. The height of each story is 3.6m. The live and dead load on each floor is 2.4 kN/m^2 and 8 kN/m^2, respectively. The live and dead load on the roof is 1.5 kN/m^2 and 4.5 kN /m^2, respectively. Take importance factor as 1 and response reduction factor as 5. Determine the seismic shear force in each story and overturning moment at the base as per IS: 1893 (Part 1)-2002.	16	L3	CO 3
Q.5		**Attempt any Two of the following**			
	a)	Define ductility. Explain ductility with the help of a graph. Explain the importance of ductility from earthquake point of view.	09	L4	CO 4
	b)	Write a note on column Jacketing.	09	L5	CO 4
	c)	Discuss the IS code provisions for spacing of loops of columns and stirrups in beams. Discuss the significance of these provisions.	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 soil liquefaction in detail.	09	L3	CO 4
	c)	Explain in details concept of friction Pendulum Bearings.	09	L3	CO 4

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