BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

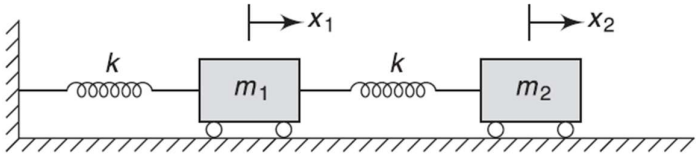
CLASS: M TECH **SEMESTER : II**
BRANCH: CIVIL **SESSION : SP/2024**

SUBJECT: CE508 EARTHQUAKE ENGINEERING

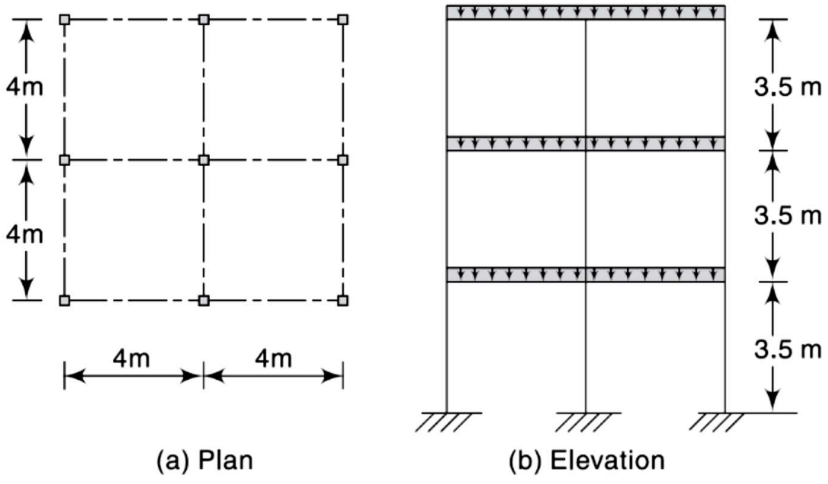
TIME: 3 Hours **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
6. IS-1893 (Part-1): 2016 is allowed in examination hall.

			CO	BL
Q.1(a)	Distinguish between the following: a) Body waves and surface waves b) Rayleigh waves and love waves c) Lithosphere and asthenosphere	[5]	1	k1
Q.1(b)	How is the epicenter of an earthquake located?	[5]	1	k1
Q.2(a)	Derive the mathematical expression for damped conditions under free vibrations.	[5]	2	k2
Q.2(b)	Determine the natural frequency and mode shapes for different modes for the system shown in Figure ($m1 = m2 = m$).	[5]	2	k2



Q.3(a)	The Plan elevation of a three storey RCC school building is shown in given figure. The building is loacted in seismic zone V. The type of soil encountered is medium stiff and it is proposed to design the building with special moment resisting frame. The intensity of DL is 10 KN/m^2 and the floors are to cater to an LL of 3 KN/m. Determine the design seismic loads on the structure by static analysis.	[5]	3	K4



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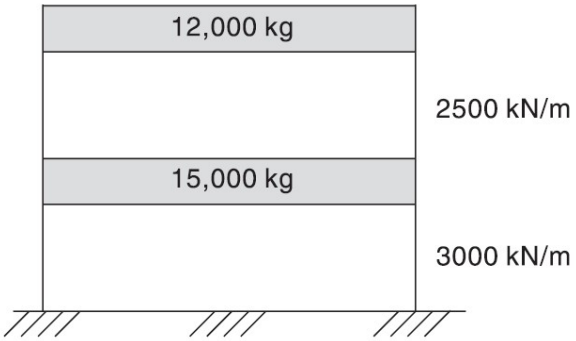
Q.3(b)	Determine the seismic forces and shears at different floor levels of the twostorey structure (shown in the figure) using the response spectrum method of IS-1893 (Part-1): 2016.	[5]	3	K4



Q.4(a)	Write a short note on different base isolation systems.	[5]	2	K2
Q.4(b)	Explain the basic concept of base isolation in enhancing the seismic response of structures	[5]	2	K2
Q.5(a)	Describe the effect of soil-structure interaction on the seismic response of structures.	[5]	2	K3
Q.5(b)	Describe the 'Direct Method' and 'Sub-structuring Method' of solving soil-structure interaction problems.	[5]	2	K3

::::::25/04/2024:::::E