

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2024

PhD CE

COURSE CODE (CREDITS): 12M1WCE213(3)

MAX. MARKS: 25

COURSE NAME: Earthquake Resistant Design of Structures

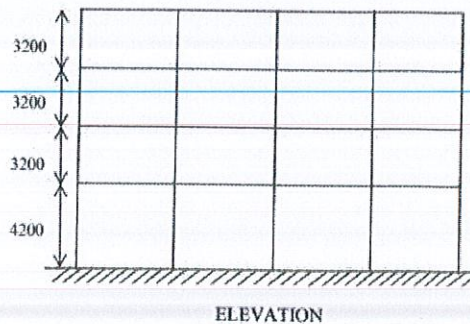
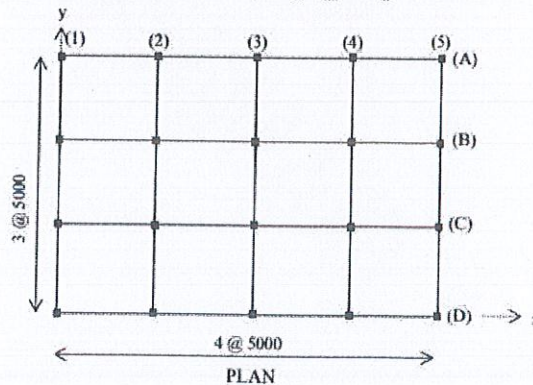
COURSE INSTRUCTORS: Dr. Tanmay Gupta

MAX. TIME: 1 Hour 30 Minutes

Note: (a) All questions are compulsory.

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems. Use of IS 1893 part 1 is allowed

Q.1 Consider a four-storey reinforced concrete office building shown in Figure below. The building is located in Shillong (seismic zone V). The soil conditions are medium stiff and the entire building is supported on a raft foundation. The R. C. frames are infilled with brick-masonry. The lumped weight due to dead loads is 12 kN/m^2 on floors and 10 kN/m^2 on the roof. The floors are to cater for a live load of 4 kN/m^2 on floors and 1.5 kN/m^2 on the roof. Determine design seismic load on the structure as per the code. (Assume any unknown) [10]



Q.2 For the building of Q.1, the dynamic properties (natural periods, and mode shapes) for vibration in the X-direction have been obtained by carrying out a free vibration analysis as given below. Obtain the design seismic force in the X-direction by the dynamic analysis method outlined in cl. 7.8.4.5 and distribute it with building height. (assume any unknown) [10]

Natural Period (sec)	Mode 1	Mode 2	Mode 3
		0.860	0.265
	Mode Shape		
Roof	1.000	1.000	1.000
3 rd Floor	0.904	0.216	-0.831
2 nd Floor	0.716	-0.701	-0.574
1 st Floor	0.441	-0.921	1.016

Q.3 Irregularities of mass, stiffness, and strength are not desirable in buildings situated in earthquake-prone areas. Describe using diagrams how these occur and affect the building. [5]

JUIT TEST-2 EXAMINATION- OCT-2024