Dr. Pankaj Kumar

Jaypee University of Information Technology, Waknaghat

T3 Examination – May 2019

M. Tech. 2nd Semester (Structural Engineering) and B Tech. 8th Semester (Civil Engineering)

Course Code: *12M1WCE213* Max. Marks: 35
Course Name: *Earthquake Resistant Design of Structures*
Course Credit: *03* Max. Time: *120 Minutes*

Note: All questions are compulsory. Carrying of mobile phone during examination will be treated as case of unfair means. Assume any missing data.

Q.1 List the plane structural irregularities for a lateral load resisting system. Explain each irregularity in detail along with the neat sketch. Write the general limitations for irregularity suggested in IS 1893-2016 or ASCE/SEI 7-16. [5]

Q.2 List the vertical structural irregularities for a lateral load resisting system. Explain each irregularity in detail along with the neat sketch. Write the general limitations for irregularity suggested in IS 1893-2016 or ASCE/SEI 7-16. [6]

Q.3 How earthquake loading influences the structural design parameters, when the concrete is unconfined. [4]

Q.4 Calculate the moment magnitude and energy of an earthquake. The dimensions of rupture area are 100 m ×50 m × 1.5 m, modulus of rigidity is 35 $\times 10^6$GPa, and magnitude of surface wave is 6. [5]

Q.5 Find the maximum relative displacement and maximum base shear of a single degree of freedom system has mass, m = 1000 kg, stiffness, k = 49kN/m, and damping, c = 700 N.sec/m. The response spectra data of an earthquake is shown in Table-1. [5]

Q.6 Write modal combination methods to obtain response of a multi degree of freedom system. [2]

Q.7 A two-story frame idealizes as shear building is shown in figure. Determine the natural frequencies and modes of the system and normalize the modes so that M_n is equal to 1. (m= 1000 kg, k = 10000 N/m) [8]

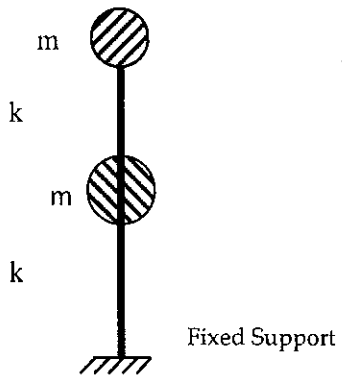

Figure: Schematic of a two story frame