

## Jaypee University of Information Technology, Waknaghat

T 2 Examination – April 2019

M. Tech. 2<sup>nd</sup> Semester (Structural Engineering) & B. Tech. 8<sup>th</sup> Semester (Civil Engineering)

Course Code: 13M1WCE213

Max. Marks: 25

Course Name: Earthquake Resistant Design of Structures

Course Credit: 03

Max. Time: 90 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 Develop an equation of motion for single degree and multi degree of freedom system of freedom system. 3

Q.2 Define impulsive force. Develop the response for a unit impulsive force  $f(t)$ , acting over a damped structure for a very small time period ( $\epsilon$ ) 5

Q.3 List the common methods used to find dynamic response of a structure under time and frequency domain analysis. 2

Q.4 A single Degree of freedom system has following properties;  
mass ( $m$ ) = 64800 N, Length ( $L$ )= 5 m, Elastic Modulus ( $E$ ) = 20 GPa, Cross section area of column ( $b$ = 300 mm,  $d$  = 300 mm), Damping has a value 20% of critical damping. The applied force  $f(t)$  is acting over the system in trigonometric form as shown in figure. 10

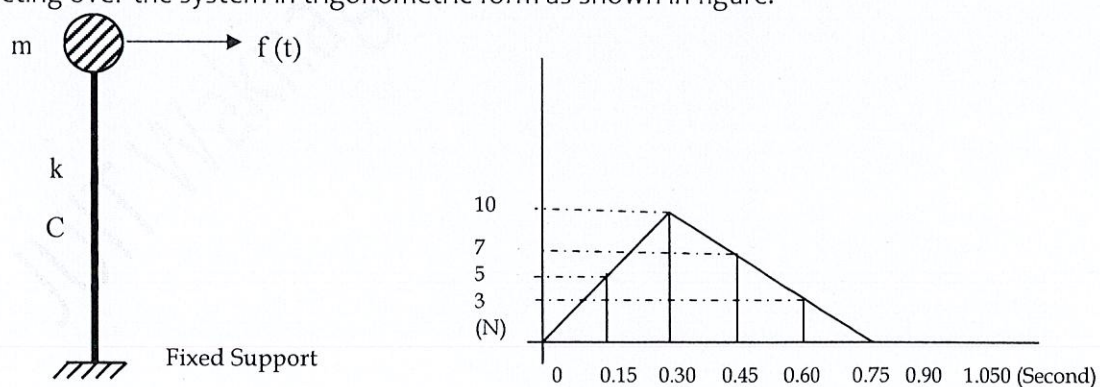


Figure 1: Schematic of; (a) a single degree mass-spring-damper system, (b) applied loading

Q.5 Explain the model superposition approach for response analysis of multi degree of freedom system. 5