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T 1 Examination – September 2019

M. Tech. 1st Semester (Structural Engineering) & B. Tech. 7th Semester (Civil Engineering)

Course Code: 11M1WCE112   Max. Marks: 15
Course Name: *Structural Dynamics*
Course Credit: 03   Max. Time: *60 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 A one story structure being tested in a laboratory can be idealized by an infinitely rigid beam supported by two columns. The columns can be considered flexible laterally but rigid axially. The mass of column is negligible when compared to the total mass m=1941 kg which is concentrated at the level of the roof. To determine the dynamic properties of the structure, a free vibration test is performed by moving the roof by 20 mm with a cable and a winch. The cable is suddenly cut to set the structure in free vibration. The maximum displacement is 15 mm after one complete cycle which takes place in 0.2 second. Compute the damping ratio (ξ), the damping coefficient (c), the lateral stiffness of the structure, and the amplitude of the motion after 10 cycles.   [5]
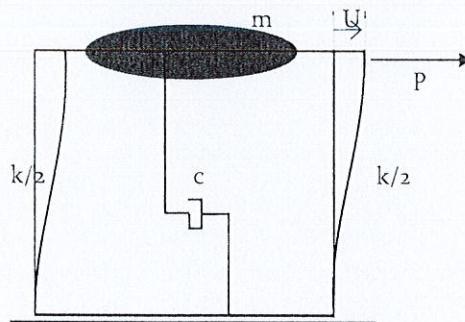
Q.2 Develop the response of under damped single degree of freedom subject under free vibration. Also, draw the quantities response for displacement time history.   [4]

Q.3 Write short note on following
  (a).   Free vibration and forced vibration
  (b).   Critically damped, under damped, and over damped system with example.
  (c).   Degree of freedom   [6]