**Course Title: Introduction to Earthquake Engineering.**

**Program: B-Tech Civil**

**Module: 6th**

**Instructor: Mr. Ihsan Ul Mulk**

**Date: 24-09-2020**

**Time: 03:00pm to 07:00pm**

**Note: Attempt all Questions.**

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| Q1. | Discuss Physical explanation of Vibration. Also explain Periodic, Random, Free, and Forced Vibrations.  | Marks (10) |
| Q2. | Determine lateral stiffness of the frame if a lateral load is applied at beam level. Assume:1.The flexural Stiffness of beam is too high as compared to that of connected Column.2.Axial deformations in beam is negligible.Take E= 27000 ksi, I= 1200in. | Marks (10) |
| Q3. | Briefly Explain Harmonic Force along with particular solution of Undamped Harmonic vibrations. And what will be the response of Undamped Systems subjected to Harmonic Forces.  | Marks (10) |
| Q4. | A video camera of mass 2.0kg, is mounted on the top of the bank building for surveillance. The video camera is fixed at one end of a tabular aluminum rod whose other end is fixed to the building. The wind induced force acting on the video camera is found to be harmonic with p(t)= 25sin 75t N. Determine the cross-sectional dimensions of the aluminum tube if the maximum amplitude of vibration of the video camera is to be limited to 0.005m. E aluminum =71Gpa.  | Marks (10) |
| Q5. | Determine the stiffness of cantilever beam by assuming that the self-weight of beam is negligible. Take E= 29000ksi, K(spring) = 200lb/ft.  | Marks (10) |