IQRA NATIONAL UNIVERSITY, PESHAWAR

Department Of Civil Engineering

Final Term Examination (Spring 2020)

Subject: Introduction To Earthquake Engineering | **Duration:** 6 Hours

Instructor: Engr Khurshid Alam | **Total Marks:** 50

Semester: B-Tech Civil 6TH | **Course Code:** CT-634

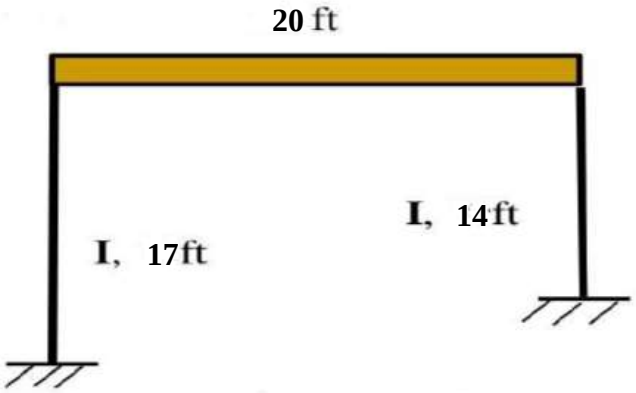
Note: Attempt all the questions.

Q.NO.(01) **(6+6)**

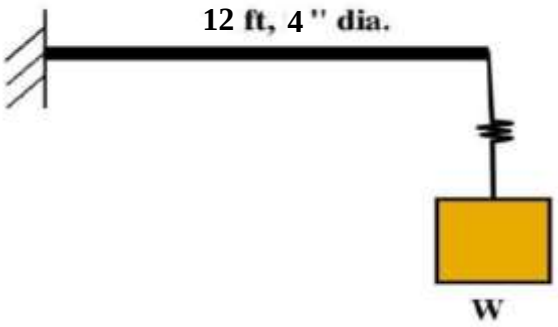
(a) Determine the lateral stiffness of the frame if a lateral load is applied at the beam level. Assume

1. The flexural stiffness of beam is too high as compared to that of connected columns.
2. Axial deformations in beam is negligible.

Take E = 28,000 ksi and I = 1400 in^4



(b) Determine the stiffness of cantilever beam by assuming that the self weight of the beam is negligible. Take E = 29,000 ksi and K_{spring} = 300 lb/ft

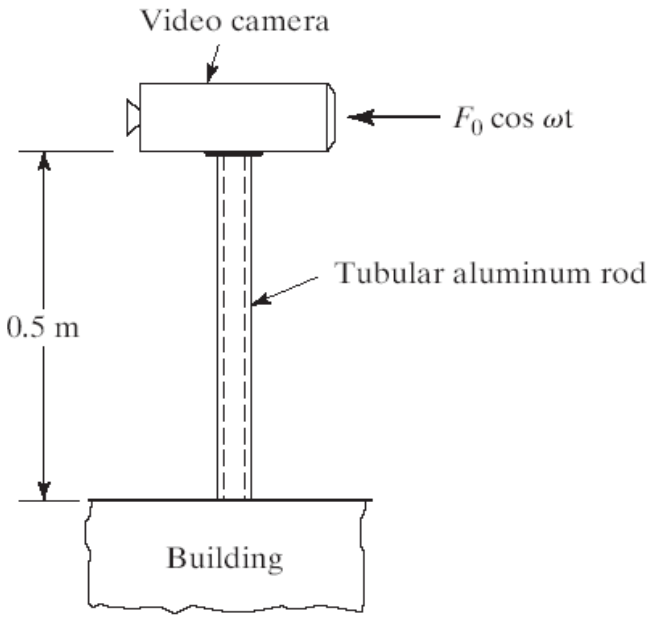


Q.NO.(02) **(12)**

A rotating machine with a 500 kg mass operating at a constant speed produces harmonic force in vertical direction. The harmonic force is expressed as p(t)= 5000 Sin 150t, where p(t) is in N. If the damping ratio of isolators at the foundation of machine is 7.0%, determine the stiffness of isolators so that the Transmissibility at the operating speed does not exceed 0.15. Also determine the amplitude of force transmitted to the foundation

Q.NO.(03) **(12)**

A video camera, of mass 3.0 kg, is mounted on the top of a bank building for surveillance. The video camera is fixed at one end of a tubular aluminium rod whose other end is fixed to the building as shown in Fig. The wind-induced force acting on the video camera, is found to be harmonic with p(t) = 25 sin 75t N. Determine the cross-sectional dimensions of the aluminium tube if the maximum amplitude of vibration of the video camera is to be limited to 0.005 m. E Aluminium = 70 GPa.



Q.NO.(04) **(8)**

What is meant by Plate boundaries and explain different types of Plate boundaries along with diagrams.

Q.NO.(05) **(6)**

What is meant by degree of freedom and differentiate between continuous and discrete systems.