Evning

D:. 13/05/2014.

Student Exam No._____

GANPAT UNIVERSITY

B. Tech. Semester: 8th Civil Engineering

Regular Examination March – June 2014

2CI808 Elective Paper – II (Design of Earthquake Resistant Structures –II)

Time: 3 Hours **Total Marks: 70**

Note: 1. All Questions are Compulsory
2. Figure to the Right indicates full marks.
3. Use of code IS1893-2002 and IS875 (part-III)-1987 are allowed.

Section - I

Que. – 1 **(A)** A spring mass dashpot system consists of a spring of stiffness 343N/m. The mass is displaced 20mm beyond the equilibrium position and release to vibrate. Find the equation of motion for the system, if the damping coefficient of the dashpot is equal to 13.72 Ns/m. **06**

(B) A platform of weight 20,000N is supported on four equal columns which are fixed to the foundation as well as to the platform. Experimentally it is found that a force of 5000N applied horizontal to the platform produces a displacement of 0.2cm. It is estimated that damping in the structure is of the order of 5% of the critical damping. Determine the following : **05**

i. Un-damped Natural Frequency
ii. Absolute damping coefficient
iii. Logarithmic Decrement
iv. The number of cycles and the time required for the amplitude of motion to be reduced from an initial value of 0.2cm to 0.02cm.

OR

Que. – 1 **(A)** A system with a natural frequency of 6 Hz starts with initial amplitude of 2 cm and an initial velocity of 25 cm/s. Determine the natural period, amplitude, maximum velocity and maximum acceleration. **04**

(B) A cantilever beam 3m long supports a mass of 500 kg at its upper end. Find the natural period and natural frequency. E= 2.1 x 10^6 kg/cm^2 and I=1300 cm^4. **03**

(C) A simply supported rectangular beam has a span 1 m. It is 100 mm wide and 10 mm deep. It is connected at mid span of beam by means of a linear spring having a stiffness of 100 kg/cm and a mass of 300 kg is attached at the other end of spring. Determine the natural frequency of the system. Take E=2.1x10^6 kg/cm^2. **04**

Que. – 2 **(A)** Derive the equation of motion for free damped vibration. **04**
(B) Explain different modes of oscillation of machine foundation block. **04**
(C) What are the general requirements of machine foundation? **04**

OR

Que. – 2 **(A)** Explain Types of pulse. **04**
(B) Difference between Under tuned & Over tuned foundation. **04**
(C) Short note on Idealization of turbo machine. **04**

Que. – 3 Calculate wind force and draw pressure diagram for a multistoried framed building which is located at Varansi having following data. **12**

Physical parameters:

- Length : 40 m
- Width : 10 m
- Height : 40 m
- Height of each storey : 4m
- Spacing of frames along the length : 5 m

Wind data

- Wind zone : 5
- Terrain category : 3
- Topography : Flat that is upwind slope < 3°
- Life of structure : 50 years.

Section – II

Que. – 4 **(A)** Describe comparative evaluation of the local retrofit strategies. **04**

(B) Explain RCC column retrofitting techniques. **04**

(C) Explain:- (i) Repair (ii) Retrofit (iii) Rehabilitation **03**

OR

Que. – 4 **(A)** Explain different types of bracing systems in steel structures. **04**

(B) Classification of structural control device. **04**

(C) Explain:- (i) Frequency (ii) Natural Frequency (iii) Damped natural frequency **03**

Que. – 5 **(A)** Types of base isolation device & its suitability with connection details. **04**

(B) Mention the methods of strengthening of walls and describe any one. **04**

(C) Short note on Idealization of turbo machine. **04**

OR

Que. – 5 **(A)** Differentiate between **04**

i. Strength and Stiffness
ii. Ductility and Flexibility

(B) Short note on Major deficiencies in RCC (structural element). **04**

(C) Short note on Condition assessment of RCC building. **04**

Que. – 6 **(A)** Define following term: **04**

i. Response spectrum
ii. Shear wall
iii. Base isolation system
iv. Mode shape

(B) Describe comparative evaluation of the global retrofit strategies. **04**

(C) Explain tuned devices. **04**

END OF PAPER