

**GANPAT UNIVERSITY****B. Tech. Semester: 8<sup>th</sup> Civil Engineering****Regular Examination May/June 2013****C805 EP-II (Design of Earthquake Resistant Structure -II)****Time: 3 Hours****Total Marks: 70**

- Instruction: 1. All Questions are Compulsory  
 2. Figure to the Right indicates full marks.  
 3. Assume Suitable Data if necessary.  
 4. Use IS 1893-2002.

**Section – I**

- Q-1 Design story shear force for mode 1 =  $\begin{bmatrix} 3938.6 N \\ 2990.89 N \\ 1323.71 N \end{bmatrix}$ , mode 2 =  $\begin{bmatrix} 741.35 N \\ -593.6 N \\ 855.32 N \end{bmatrix}$ , mode 3 =  $\begin{bmatrix} 84.76 N \\ -206.86 N \\ 217.74 N \end{bmatrix}$  find out lateral force at each story due to all modes by SRSS and CQC method. The value of  $\omega$  are as  $\begin{bmatrix} 6.33 \text{ rad/s} \\ 17.34 \text{ rad/s} \\ 24.00 \text{ rad/s} \end{bmatrix}$  12

- Q-2 (A) A shaft of 10 mm diameter and 0.20 m long connects a generator to the main engine. If the mass MI of the generator rotor is  $0.55 \text{ Nmms}^2$ . Determine the natural frequency in torsion. Take  $G=8 \times 10^6 \text{ N/cm}^2$  07

**OR**

- Q-2 (A) A machine weighing 113.64 kg is mounted on a support system consisting of four springs and four dampers. The vertical deflection under the weight of the machine is 2.032 cm. The dampers are designed to reduce the amplitude of vertical vibration to  $1/8^{\text{th}}$  of the initial amplitude after two complete cycles of free vibration. Find out Undamped natural frequency, Damping ratio and Damped natural frequency. 07

- Q-2 (B) Explain different modes of oscillation. 04

**OR**

- Q-2 (B) What are the general requirements of machine foundation? 04

- Q-3 Attempt any TWO. 12

- (A) What do you mean by over-damped, under-damped and critically damped system?  
 (B) Explain Logarithmic Decrement.  
 (C) Derive the equation of motion for free damped vibration of SDF system.

## Section – II

Q-4 For three storey building frame lumped mass 3000 kg, 3000 kg and 2000 kg from bottom storey to top storey and stiffness throughout the column is  $5 \times 10^5$  N/m. Using Response Spectrum Method find out the lateral force for ground level and draw mode shape. 12

Q-5 (A) Explain floating Column. 06  
(B) Explain with sketch Short Column effect. 06

OR

Q-5 (A) How does IS : 1893-2002 distinguish an OMRF and SMRF. 06  
(B) Explain torsion in buildings. How it can be avoided? 06

Q-6 (A) Describe comparative evaluation of the **Global Retrofit Strategies and Local Retrofit Strategies**. 06  
(B) Steps of seismic Retrofit with Flow chart of retrofit. 05

OR

Q-6 (A) Need for Seismic Evaluation of Existing Building. 06  
(B) Mention general Defects in RCC and Masonry Building. 05

End of Paper