

Student Exam No. _____

GANPAT UNIVERSITY

B. Tech. Semester: VIII (CIVIL) Engineering

Regular Examination April-June 2017

2CI808 ELECTIVE PAPER – II

DESIGN OF EARTHQUAKE RESISTANT STRUCTURES - II

Time: 3 Hours / As per Scheme

Total Marks: 70

Instructions:

- (1) This Question paper has two sections. Attempt each section in separate answer book.
- (2) Assume suitable data if required and mention it clearly.
- (3) Figures on right indicate marks.
- (4) Be precise and to the point in answering the descriptive questions.
- (5) IS 1893 (Part-1) : 2002 and IS 875 (Part-3) : 1987 is allowed

Section - I

- Que.-1 (A)** Calculate base shear for the six storey RC frame building for hospital (11)
located at Mehsana, using seismic coefficient method for the following data:

Number of bay in X direction : 6	Number of bay in Y direction : 4
Bay width : 4m in both direction	Storey Height : 3.5m
Slab Thickness : 0.15m	Beam Size : 0.23 m X 0.45 m
Column Size : 0.3 m X 0.6 m	Live Load : 4 kN/m ²
Internal wall thickness : 0.115 m	External wall thickness : 0.230 m

Assume suitable data if required. Give your calculation with appropriate clause number of IS code. Also draw distribution of shear at each floor level

OR

- Que.-1 (A)** Explain Modal Analysis for different types of buildings. Enlist the steps (06)
for computation of different quantities of modal analysis.
- (B)** Explain effect of Irregularities on performance of RC buildings. (05)

- Que.-2 (A) Determine the magnification factor of forced vibration produced by an oscillator fixed at the middle of the beam at a speed of 600rpm. The weight concentrated at the middle if the beam is $W = 5000 \text{ N}$ and produces a static deflection of the beam equal to 0.025 cm . neglect the weight of beam and assume that the damping coefficient is equal to 20 Ns/mm . (06)
- (B) Which type of precaution is required if machine foundation is not provided? (06)

OR

- Que.-2 (A) The spring mass system is deflected by static deflection and release to vibrate, it vibrates with 3 Hertz. When additional mass of 10 kg added and repeated the procedure, the spring mass vibrates with 2.5 Hertz. Calculate the stiffness of the spring and mass. (04)
- (B) Calculate natural frequency of a simply supported beam of span length 'L' m having mass 'm' at distance 'a' from its left end. The rectangular beam has size 'b X d'. If mass 'm' is acting at 'L/2' distance what is the ratio of frequency for both the system. (04)
- (C) Define the term multi degree freedom system. Derive the equation of motion for multi degree freedom system. (04)

- Que.-3 Calculate natural frequency and corresponding mode shapes for the system as given below. Normalize modes so that $M_n = 1$. Also verify orthogonal condition. (12)

Storey No.	Mass 'm' in kg	Stiffness 'k' in kN/m
1	23625	5526
2	11475	7974

Section – II

- Que.-4** (A) Explain in brief (06)
- I. Shear Wall
 - II. Condition Assessment
 - III. P- Δ effect
- (B) Explain in detail column jacketing (06)

OR

- Que.-4** (A) What is difference between repair, retrofit and rehabilitation (06)
- (B) Derive the equation of motion for single degree free damped vibration system. (06)

- Que.-5** (A) Explain in detail classification of retrofitting technique. (06)
- (B) Write a short note on methods for retrofitting of masonry building. (06)

OR

- Que.-5** (A) Explain RCC beam retrofitting techniques. (06)
- (B) Write a short note on retrofitting using Fiber Reinforced Polymer. (06)

- Que.-6** (A) Write a short note on structural control system. (05)
- (B) Explain Viscous, and Tune mass damper in detail. (06)

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