Seat No: _____ **Enrollment No: _____**

PARUL UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

M.Tech., Winter 2017 - 18 Examination

Semester: 2 **Date: 12/01/2018**

Subject Code: 03209182 **Time: 02:00PM to 04:30PM**

Subject Name: Design of Disaster Resistant Structures **Total Marks: 60**

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.
5. Use of IS Code 1893, 13920, 875 etc is permitted

Q.1 A) State and Explain the seismic design philosophy as per Indian Seismic Code. **(05)**

B) Explain strong column weak beam concept. How such philosophy ensures good seismic design. **(05)**

C) Compare the static & dynamic analysis as per Indian Seismic Code. **(05)**

Q.2 **Answer the following questions**. (Attempt any three) (Each five mark) **(15)**

A) Discuss in detail the concepts of the ductile detailing in Beams.

B) Derive the motion equation for the free damped vibration.

C) Explain the open ground storey buildings vulnerability with mechanism.

D) Explain various irregularities found in the civil engineering structures from earthquake point of view

Q.3 A) Discuss the flexure versus shear failure of beams. **(07)**

B) Consider a SDOF system with mass, m = 2×10^3 kg, stiffness, k = 60 kN/m and damping, c = 0.44 kN.sec/m. Using the response spectra of El-Centro, 1940 earthquake, compute (a) Maximum relative displacement, (b) Maximum base shear and (c) Maximum strain energy. **(08)**

OR

B) Explain the importance of shear wall in RC frame buildings. Also explain its geometry, detailing and positions as per seismic design. **(08)**

Q.4 A) A SDOF system having the amplitude of vibration in successive cycle are 0.90, 0.45, 0.23, 0.11 units respectively. Determine damping ratio of the system. **(07)**

OR

A) A five storeyed building has size of 30m x 30m. It is located in Bhuj and resting on hard soil. The weights of floors and height of the floors are 2000kN, 2500kN, 2500kN, 2500kN and 2100kN and 4.5m, 3.5m, 3.5m, 3.5m and 3.5m respectively from slab no.1 from bottom. Assuming the building as special moment resisting office building, calculate the horizontal shear forces acting at the each slab level by equivalent lateral force method **(07)**

B) Define the terms: (any four) **(08)**

i) Performance-based design ii) Response reduction factor iii) Base isolation iv) Short column effect. v) Strength-stiffness relation.