

Total No. of Questions : 8]

SEAT No. :

P5292

[Total No. of Pages : 2

[5562]-145

M. E. (Civil - Structures Engg.)

**ANALYSIS AND DESIGN OF EARTHQUAKE RESISTANT
STRUCTURES**

(2017 Pattern) (Semester - III) (End Semester)

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) *Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.*
- 2) *Neat diagram must be drawn wherever necessary.*
- 3) *Figures to the right side indicates full marks.*
- 4) *Assume Suitable data if necessary and clearly state.*
- 5) *Use of cell phone is prohibited in the examination hall.*
- 6) *Use of electronic pocket calculator is allowed.*
- 7) *IS 1893 is allowed.*

Q1) a) Describe types of plate boundaries. [5]

b) Explain philosophy of earthquake resistant design. [4]

OR

Q2) a) Describe with neat figure [5]

- i) Seismographs
- ii) Epicenter
- iii) Hypocenter or focus

b) Describe types of earthquakes. [4]

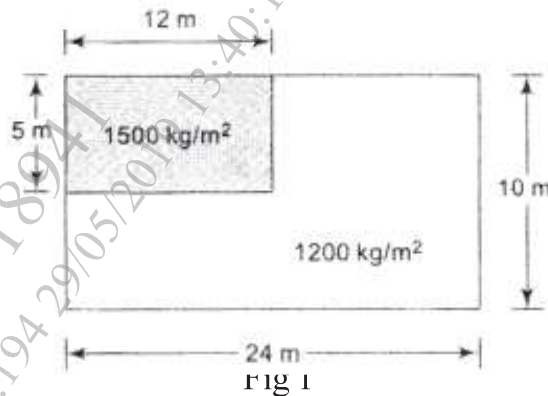
Q3) a) Explain what twist does to building members. [5]

b) Define mass irregularities. [4]

OR

P.T.O.

- Q4) a)** A building having non uniform distribution of mass in Fig 1 locate its center of mass. [5]



- b) Write short note on pounding. [4]
- Q5) a)** Why short columns are more damaged during Earthquakes? [6]
- b) Define code based procedure for seismic analysis. [10]
- Equivalent lateral force
 - Response spectrum analysis
 - Time history analysis

OR

- Q6) a)** Explain Methods of seismic retrofitting. [9]
- b) Why weak beam and strong column combination are considered to be more earthquake resistant than strong beam and weak column combination? [7]
- Q7) a)** State IS 3370 code provisions for water tanks. Write design procedure for water tank. [8]
- b) Explain why buildings with shear walls preferred in seismic regions. Discuss the concept of flanged shear wall. [8]

OR

- Q8) a)** Calculate time period of water tank whose mass is 201869kg and stiffness is $2.22 \times 10^8 \text{ N/m}$. [8]
- b) Explain ductile detailing consideration as per 13920 for lap splices in beam, beam web reinforcement, column and joint detailing. [8]