Code No: **RT42013C** **R13** **Set No. 1**

IV B.Tech II Semester Regular/Supplementary Examinations, April/May - 2019

EARTHQUAKE RESISTANT DESIGN

(Civil Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B

Answer ALL sub questions from Part-A

Answer any THREE questions from Part-B

*****

PART–A *(22 Marks)*

1. a) Explain the local site effects on the earthquake ground motion characteristics. [4]
   b) Define DOF and list out the various elements of a vibratory system. [3]
   c) Define ductility and explain the importance of ductility. [4]
   d) Explain the influence of zone factor on the lateral load of a building. [3]
   e) Explain the importance of scales of an earth quake. [4]
   f) Explain the design approach of an earthquake resistant structure. [4]

PART–B *(3x16 = 48 Marks)*

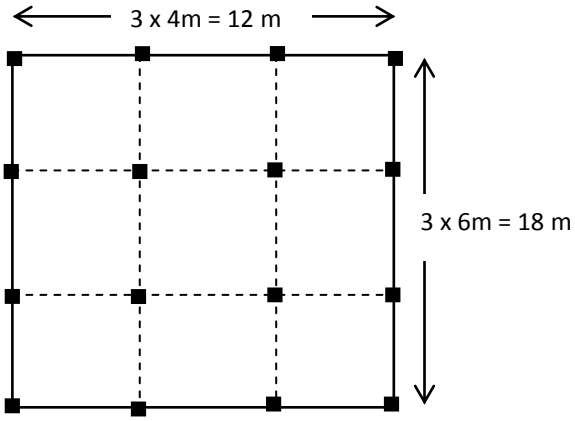
2. a) Explain different types the properties of seismic waves. [8]
   b) Explain the theory of plate tectonics. [8]

3. a) Define Logarithmic decrement. Explain the procedure to obtain the damping coefficient of a SDOF system subjected to vibrations. [8]
   b) Derive the dynamic magnification factor for a SDOF of mass (m) and stiffness (k) subjected to forced vibrations $F(t) = P \sin \omega t$. [8]

4. a) Explain the various architectural considerations influencing the seismic performance of a building. [8]
   b) Explain the effect of infill wall on the performance of a Moment Resisting Frames. [8]

5. a) Explain the parameters influencing the natural period of vibration of the structure and its importance in the design of an earthquake resistant structure. [6]

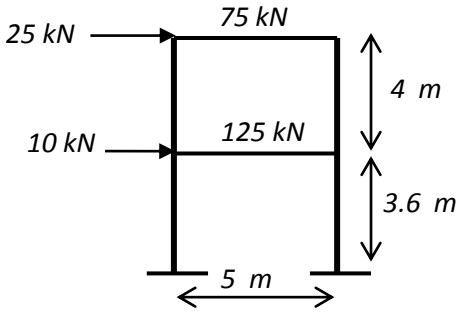
b) A five storeyed RC framed office building with brick infill is to be constructed in Vijayawada, plan is as shown in Figure. The height between the floors is 3.6 m. The soil below the foundation is assumed to be medium soil. Dead load on roof is 1 kN/m^2 and 2 kN/m^2 on floors. The live load on roof is 2 kN/m^2 and 4 kN/m^2 on floor. Determine the lateral forces acting on the building. Assume the size of the columns 300 mm× 450 mm and beams 300 mm× 350 mm. Use seismic coefficient method.



[10]

6. Draw the ductile detailing provisions of a beams **p** of an RCC frame of earthquake resistant structure and explain salient features. [16]

7. Design the various elements of an RCC frame subjected to seismic weights as shown in Figure. Use response spectrum method.



[16]