

BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI  
II Semester 2021-2022

Mid-semester Examination (10-3-2022)

Duration: 90minutes

Course: CE F419 (Geotechnical Earthquake Engineering & Machine Foundation)

Closed Book

Max. Marks: 30

Formula sheet in one A4 size paper is permitted.

1. Write short note on tectonic setting of India. [5]
2. There is critical and lifeline structure in seismic zone III. Its response reduction factor is 4. Natural period of structure is 0.208sec. Soil at site is found to be medium stiff. Determine design horizontal seismic coefficient as per response spectrum method according to IS 1893 part 1 corresponding to 5% damping. [5]
3. Standard wood-Anderson seismograph with natural period 0.8sec, damping factor 80%, static magnification 2800 located 100km from epicenter records maximum trace amplitude of 12cm. Determine the local magnitude of earthquake. [3]
4. The type of soil affects its response under dynamic loading conditions. Justify the statement. [5]
5. A hospital is to be constructed near a river in seismic zone IV. At the site there is cohesionless soil deposit with 27% fines (FC).  $(N_1)_{60} = 13$ . As per IS 1893 part 1, at a depth of 3m from ground level, determine factor of safety with respect to liquefaction. Expected moment magnitude of the earthquake is 6.9. Water table is at 1m depth from ground level and unit weight of soil is  $21\text{kN/m}^3$  above and below water table. Unit weight of water is  $10\text{kN/m}^3$ . [12]