VIT

Vellore Institute of Technology

(Deemed to be University under section 3 of UGC Act, 1956)

School of Civil Engineering

Continuous Assessment Test – I

Programme Name & Branch: B.Tech Civil Engineering

Course Name & Code: Geotechnical Earthquake Engineering CLE2014

Class Number: VL2019201003515 **Slot:** B1 **Exam Duration:** 90 min

Maximum Marks: 50

Answer all the Questions

1. In the event of Tsunami on 26-12-2004 due to earthquake in Indonesia, thousands of people were killed in coastal areas of India. Even after disastrous consequences of Bhuj Earthquake (occurred on 26-01-2001), many high rise buildings in India are being constructed with soft storey.
   Discuss various seismic hazards and their effects in view of the above statements. *(10 marks)*.

2. Why epicentres of majority of past earthquakes were located at plate boundaries? Explain the mechanism. (10 marks)

3. Differentiate between Intensity and Magnitude for describing the size of earthquakes. Describe Modified Mercalli Intensity (MMI) scale. Indicate the appropriate maximum intensity for Vellore. (10 marks)

4. (A) How do you estimate the frequency content of a strong ground motion? Mention the significance of frequency content. (5 marks)
   (B) Mention a typical predictive relationship for estimating the ground motion parameters and discuss various factors influencing ground motion. (5 marks)

5. **(A)** The maximum ground displacement of R-wave (having period of 20 s) of 16.5 mm is recorded in a seismograph located at an epicentral distance of 1350 km. Find Surface wave magnitude (M_S) of the earthquake. (4 marks)
   (B) Prove that the energy released in an earthquake of $M_S = 8$ is 32 times more than that of $M_S = 7$. (2 marks)
   (C) An earthquake causes an average of 3.5 m strike-slip displacement over a 100 km long, 25 km deep portion of a transform fault. If the rupture strength of rock along the fault is 180 kPa, find the moment magnitude (M_w) of the earthquake. (4 marks)