

MODEL QUESTION PAPER

S8C

08.807.1 Elective -V

GEOTECHNICAL EARTHQUAKE ENGINEERING

Time: 3 hrs

Marks: 100

PART A

Answer all questions. All questions carry equal marks

- I. a. Estimate total seismic energy released during an earthquake of Magnitude 7.
- b. List the earthquake hazards related to geotechnical engineering.
- c. Define Moment Magnitude of Earthquake.
- d. Define Cyclic Stress Ratio (CSR) and number of equivalent uniform stress cycles.
- e. Differentiate between low-strain and high strain tests used for the measurement of dynamic soil properties.
- f. List five soil improvement methods for mitigation of Earthquake hazards.
- g. Differentiate between seismic down-hole test and seismic up-hole test.
- h. Define critical void ratio and state the use of critical void ratio line in liquefaction studies.

[8 X 5 = 40]

PART B

Answer any one question from each module

Module I

- II. a. Describe continental Drift and Plate Tectonics. [10]
- b. An earthquake causes an average of 2.5m strike-slip displacement over an 80 km long, 23km deep portion of a transform fault. Assuming the rock along the fault had average rupture strength of 175 kPa, estimate the seismic moment and moment magnitude of the earthquake. [10]
- III. a. Describe the criteria by which liquefaction susceptibility can be judged. [10]
- b. Differentiate between Flow Liquefaction and Cyclic Mobility. [10]

Module II

- IV. a. Describe seismic refraction test setup with principle and procedure for horizontal layering. [10]
b. Describe Seismic Cross-hole test. [10]
- V. a. State the advantages and limitations of shaking table test and centrifuge test. [10]
b. Define the terms: Maximum shear modulus, Shear modulus, Damping ratio, Modulus reduction curve, Damping ratio curve. [10]

Module III

- VI. a. Describe Seismic design considerations of foundations based on bearing capacity and settlement. [10]
b. Explain any one ground improvement method based on drained technique for mitigation of earthquake hazards. [10]
- VII. a. Write in detail about Vibroflotation [10]
b. Write a short note about the estimation of earthquake induced settlement of dry sand. [10]