<u>CE518: Dynamics of Soils and Foundation</u>

End Semester Examination

Time: 2 hours   Marks: 50

Answer all questions. The questions carry equal marks.

1. What are the forces acting on the mass of a single degree freedom system supported by spring and dashpot? Sketch the free body diagram.

2. A mass is attached to a spring having a stiffness of 6 N/mm. When the mass was displaced and released, the period of vibration was found to be 1.8 sec and the ratio of consecutive amplitude was 4.2 to 1. Determine the amplitude and phase angle when a force F = 2 sin 3t N acts on the system.

3. Differentiate among Primary waves, Secondary waves and Rayleigh waves in elastic half space.

4. Derive the equation for displacement amplitude for a rod of finite length with one end fixed and other end free and sketch the distribution of displacement for first three harmonics.

5. The shear velocity at a point 3 m from ground surface is 120 m/s. Determine the dynamic shear modulus at the points 4 m and 6m from ground surface if γ = 20 kN/m^3 and water table is at a depth of 5 m from ground surface.

6. Explain the cyclic plate load test.

7. A vertical retaining wall is 8 m high and retains non-cohesive backfill with γ = 18 kN/m^3, $\emptyset$ = 35^0, and δ = 20^0. The backfill is inclined to the horizontal by 15^0. The wall is in seismic area where α_h = 0.10 and α_v = 0.05. Compute dynamic earth pressure on the wall using Culmann's graphical construction.

8. Write the general bearing capacity equation for dynamic loading and explain the terms.

9. Differentiate among liquefaction, initial liquefaction, and cyclic liquefaction.

10. Explain any five factors affecting liquefaction.

27/04/2022 E