

**SEMESTER EXAMINATION,
2022-23 YEAR**

Programme – 1st Yr. M.Tech – GEOTECHNICAL ENGINEERING

Advance Soil Dynamics**Duration : 3:00 hrs****Max Marks: 100**

Note:-Attempt all questions. All Question carry equal marks. In case of any ambiguity or missing data, the same may be assumed and state the assumption mad in the answer.

Q 1. Answer any four parts of the following.

- a) Explain consolidation by sand drains
- b) Explain equal strain consolidation with no smear.
- c) What is the effect of secondary consolidation on preconsolidation pressure.
- d) Explain Henkel's modification of pore water pressure equations.
- e) Explain the relation of undrained shear strength with effective overburden pressure.
- f) Explain the shear strength of granular soils under plain strain condition? Give a simple correlation to obtain friction angle.

Q 2. Answer any four parts of the following.

- a) (a) Explain the following:-
 - i) IS classification of soil
 - ii) Specific surface
 - iii) Isomorphous substitution
 - iv) Diffused double layer
- b) Explain what is meant by 1:1 and 2:1 clay minerals? Give two examples each.
- c) Explain what is meant by Base Exchange capacity. What are the different types of bonds in clay particles.
- d) Explain how the swelling pressure is determined by conducting Oedometer test
- e) In a triaxial test, a soil sample was consolidated under a cell pressure of 700 kN/m² and a back pressure of 350 kN/m². Thereafter with drainage not allowed, the cell pressure was raised to 800 kN/m² resulting in the increased pore water pressure reading of 445 kN/m². The axial load was then increased to give a deviator stress of 575 kN/m² (while the cell pressure remained at 800 kN/m²) and a pore pressure reading of 640 kN/m². Calculate pore pressure coefficients

Q 3. Answer any two parts of the following.

- a) Explain Henkel's modification of pore water pressure equations
- b) Explain the relation of undrained shear strength with effective overburden pressure
- c) Explain the shear strength of granular soils under plain strain condition? Give a simple correlation to obtain friction angle.
- d) Explain the method of settlement prediction by Terzaghi's method from plate load test observation.

e) Explain the preloading technique used for improving soil properties.

Q 4. Answer any two parts of the following.

- a) The relative compaction of a sand in the field is 93.5%. The maximum and minimum dry densities are 16.98 kN/m^3 and 14.46 kN/m^3 respectively. For field condition, determine dry unit weight.
- b) Explain the stress path method of settlement computation.
- c) Write a note on field compaction control.

Q 5. Answer any two parts of the following.

- a) What is the effect of sample disturbance on the test results of clay in the following tests
 - (i) Compression Index
 - (ii) Shear strength parameters
 - (iii) Shear modulus.
- b) Explain pressure meter tests. Also give limitations of this method
- c) Write explanatory notes on (i) Dilatometer test (ii) Borehole shear test.