



ANDHRA UNIVERSITY

TRANS-DISCIPLINARY RESEARCH HUB

GEOTECHNICAL PROCESSES

Compaction: Theory of compaction, Shallow Surface Compaction -Equipment, Placement water content, factors affecting shallow compaction; Deep compaction: Methods -Vibroflotation, Terra probe method, Pounding, Blasting, Compaction piles; Compaction Control.

Preconsolidation with Vertical Drains: Sand drains, Sand wicks, Rope drains, Design of vertical drains

Stabilization: Introduction, objectives, Methods of stabilization –Mechanical, Cement, Lime, Bituminous, Calcium chloride; construction methods, factors affecting stabilization of soils; Deep Mixing methods –Soil lime Columns and Cement Lime Columns, applications

Dewatering: Definition, necessity, Methods of dewatering –Interceptor ditch, Single, Multistage and Vacuum well points, Horizontal wells, Electro-osmosis. Permanent drainage by Foundation drains and Blanket drains.

Grouting: Definition, Objectives of grouting, Grouts and their properties, Categories of Grouting, Grouting methods: Ascending, Descending and Stage Grouting in Soils, Hydrofracture, Grouting Equipment, Post grouting tests.

Reinforced Earth: Concept, Materials, Friction Coefficient of Reinforcement with Fill: Determination, Influencing factors, Applications; Geosynthetics – Types, functions, applications and Durability.

In-situ Reinforcing techniques: Ground Anchors, Tiebacks and Soil Nailing, Micropiles.

Stone columns: Construction, Functions, Load carrying capacity of ground reinforced with stone columns, limitations

Reference Books:

1. Manfred R. Hausmann, 1990, McGraw Hill Publishing Co.,
2. Purushotham Raj P., 2016, Ground Improvement Techniques, 2nd Edition, Laxmi Publications, New Delhi.
3. IS 13094-1992, Selection of ground improvement techniques for foundation in weak soils-guidelines; Bureau of Indian Standards, New Delhi.



ANDHRA UNIVERSITY

TRANS-DISCIPLINARY RESEARCH HUB

GEOTECHNICAL PROCESSES

MODEL PAPER

Time: 3 Hours

Max. Marks: 100

Note: 1 Answer any FIVE Questions

1. a) Explain the effect of compaction on engineering properties of soils.
b) Describe “Pounding” technique used in densification of soils. Suggest the height of fall for 25t hammer for densification of 10m thick loose sand deposit. What will be the lateral distance up to which vibrations due to pounding will be transmitted?
2. a) What is the concept of strengthening of soft clays with “Vertical drains and Preloading”. Describe “Strip Drains” used in strengthening of soft clays.
b) Determine radius of influence for vertical drains proposed to be installed at uniform spacing ‘s’ in a) Square Patten and b) Triangular pattern.
3. a) What is meant by Stabilisation of soils? What the objectives of stabilisation are of soils
b) Describe the Cement stabilisation of soils. What are the engineering benefits of cement stabilisation.
4. a) Explain the Benefit of Placement of Reinforcement in soils based on Pseudo cohesion concept.
b) Describe different types of reinforcing materials used to improve stability of soils.
5. a) Explain the necessity of dewatering in soils.
b) Describe vacuum well point system used in dewatering of silty sands with neat sketch.
6. a) Distinguish between “Clay Grout” and “Cement Grout”.
b) Describe the categories of grouting based on mode of entry of grout in to ground.
7. a) Distinguish between “woven” and “Non-woven” Geotextiles.
b) Describe the tests conducted on Geotextiles for determination of mechanical Properties.
8. a) Describe the Construction procedures of Stone Columns.
b) What is a “Soil-Lime Column” and state its applications.