JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF ENGINEERING AND TECHNOLOGY

UNIVERSITY EXAMIMATION FOR THE DEGREE IN SCIENCE IN CONSTRUCTION MANAGEMENT

2nd YEAR 1st SEMESTER 2024/2025 ACADEMIC YEAR

CENTRE: MAIN CAMPUS

COURSE CODE: TCB 1201

COURSE TITLE: SOIL MECHANICS

EXAM VENUE: **STREAM: BSc. CONSTRUCTION MGT**

DATE:16/1/25 **EXAM SESSION:9-11.00 AM**

DURATION: 2 HOURS

Instructions

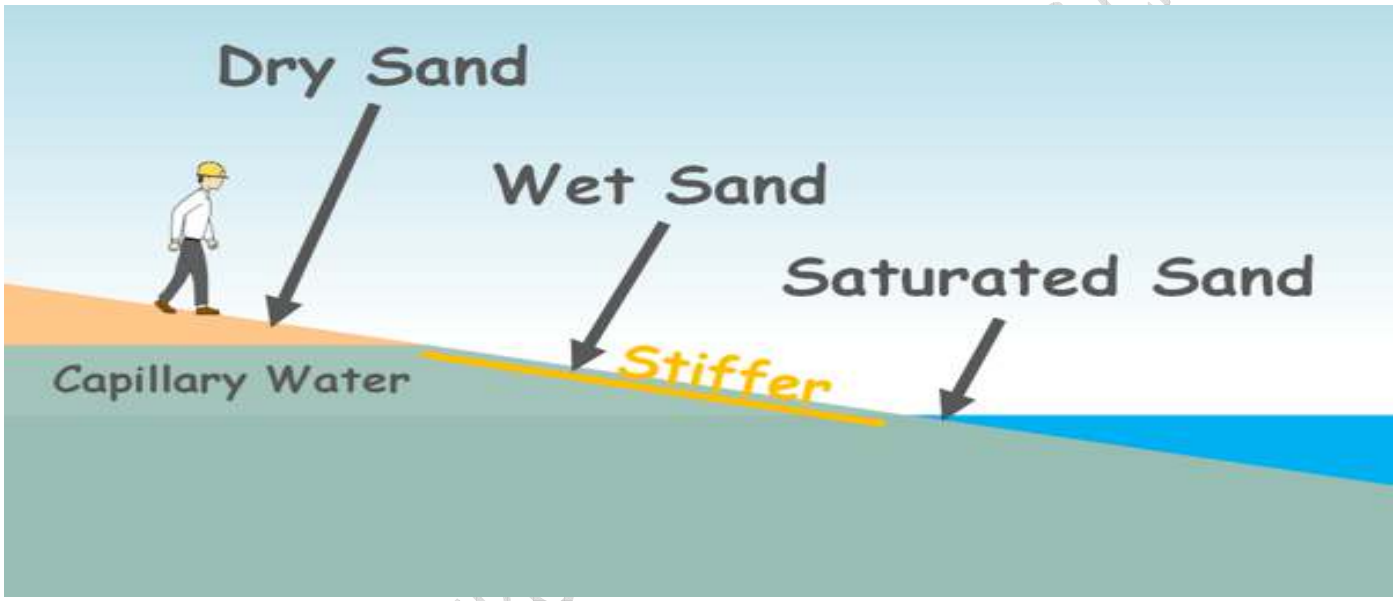
1. **Answer question 1 (Compulsory) and ANY other two questions**
2. **Candidates are advised not to write on question paper**
3. **Candidates must hand in their answer booklets to the invigilator while in the examination room.**

QUESTION ONE (30 Marks)

a. List and describe six (6) properties of soil as a construction material? (6 Marks).

b. Classification systems are used to group soils according to their order of performance under given set of physical conditions. Soil may be broadly classified into FOUR (4). Name and describe these classifications? (8 Marks).

c. Explain the capillary action on sand phenomenon below? (4 Marks).



d. Soil structure is the geometrical arrangement of the solid parts of the soil, therefore, it is important for us to understand the structure of soil deposits. List, draw and discuss six (6) of these soil structures? (6 Marks).

e. The amount by which the ground can shrink and/or swell is determined by various factors. Name THREE (3)? (6 Marks).

QUESTION TWO (20 Marks)

a. Using sketches, list and describe three (3) Stresses developed in saturated soil? (6 Marks).

b. Define Permeability of Soil? (2 Marks)

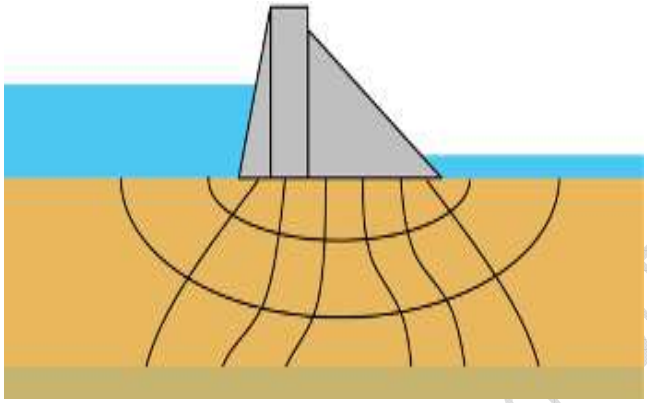
c. The mechanical analysis is the determination of the size range of particles present in the soil, expressed as a percentage of the total dry weight. Two methods are used to find the particle-size distribution of soil. Name and describe one of the TWO (2) methods of —for particle sizes smaller than 0.075 mm in diameter? (6 Marks).

d. Describe the concept of Flow Net and its application in solving engineering problems? (6 Marks).

QUESTION THREE (20 Marks)

a. Classification systems are used to group soils according to their order of performance under given set of physical conditions. Soil may be broadly classified into FOUR (4). Name and describe these classifications? (8 Marks).

b. A weir is resting on a fine sand soil of permeability 2 x 10^{-5} m/s. the water level on the upstream of weir is 6.0m and that on the downstream is 0.7m. Determine the amount of seepage per meter through the base of the weir per day. (3 Marks).



a. List and describe THREE (3) stages in the consolidation of soil)? (6 Marks).
b. Describe Mechanical Stabilization? (4 Marks).

QUESTION FOUR (20 Marks)

a. Name FOUR tests applied for carrying out Bearing Capacity of soil and describe ONE of the FOUR tests? (6 Marks).

b. The structure of the soil is disturbed to the considerable degree by the action of the boring tools or the excavation equipment. The disturbances can be classified in five (5) basic types. List them? (5 Marks).

c. Retaining walls are generally classified into five (5) types in accordance with shapes, characteristics, design criteria and applications. List them? (5 Marks).

d. List and describe four (4) causes of retaining wall failure? (4 marks).

END