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FEDERAL UNIVERSITY OF TECHNOLOGY, OWERRI
SCHOOL OF ENVIRONMENTAL TECHNOLOGY
DEPARTMENT OF BUILDING TECHNOLOGY
RAIN SEMESTER EXAMINATION 2011/2012 SESSION.

Course: BDT 204 -Soil Mechanics.

Time: 2¹/₂ Hrs.

Instruction: Answer question one and any other two.

1a. i) What is dilatancy.

ii) Explain Gradation of soil.

1b. The result of a sieve analysis test on a soil sample were

SIEVE SIZE (mm)	MASS RETAINED(g)
10	0.0
6.3	5.9
2.0	25.3
1.0	22.7
0.6	21.6
0.3	16.9
0.15	12.3
0.063	6.5

4.3g passed through the 63 μ m sieve. Plot the particle size distribution curve and determine the uniformity coefficient of the soil.

2a. Explain the origin of soil with particular reference on clay soil.

2b. Produce the diagram for different structures of clay particles.

2c. Write short notes on types of rocks.

2d. Differentiate between plasticity index and liquidity index.

2e. Explain specific gravity, saturated unit weight, bulk unit weight.

3a. A soil sample was placed in a moisture content tin of mass 25.32g, the combined mass of the soil and tin was 53.23g. After oven drying the soil and the tin had a mass of 48.2g. Determine the moisture content value of the soil.

3b. Write short notes on liquid limit, plastic limit, plasticity index, void ratio and porosity.

3c. Prove that $e = n/n-1$

4a. Write out the expressions for

i) Bulk density

ii) Saturated density

iii) Dry density

iv) Buoyant density

4b. In a bulk density determination, a sample of clay with mass of 683g was coated with paraffin wax. The combined mass of the clay and wax was 690.6g. The volume of the clay and the wax was found by immersion in water, to be 350ml. The broken sample, whose moisture content and particle specific gravity test gave values of 17% and 2.73 respectively. The specific gravity of the soil was 0.89. Determine the bulk density and unit weight, void ratio and degree of saturation.