

FEDERAL UNIVERSITY OF TECHNOLOGY, OWERRI
DEPARTMENT OF SOIL SCIENCE AND TECHNOLOGY
RAIN SEMESTER EXAMINATION 2018/2019 SESSION
COURSE TITLE: (SST 202) INTRODUCTION TO SOIL SCIENCE (2 UNITS)
TIME: 2^{1/2}HRS

INSTRUCTION: Answer FIVE questions only with at least ONE question from each section

SECTION A

- (1a) Explain the following with respect to rock weathering of minerals.
- i) Thermal expansion and contraction (ii) Oxidation (iii) Hydrolysis (iv) Pressure release /unloading (v) Carbonation (10 marks)
- (1b) Differentiate between eluviation and illuviation as soil forming processes. (5 marks)
- 2a) Explain how climate affects soil formation indirectly (6 marks)
- b) Define soil profile (3 marks)
- c) Mention the twelve (12) soil order of taxonomic classification (6marks)

SECTION B

- 3a What is the H⁺ concentration of a soil sample that has a pH of 5.78? (Assuming Log5 = 0.698, log 6 = 0.790, 10^{0.22} = 1.66) (5mks)
- 3b. Differentiate between latent acidity and active acidity (5mks)
- 3c. Explain how precipitation control soil reaction (5mks)
- 4a. Mention four types of soil colloid (4mks)
- 4b. Enumerate five factors that affect soil organic (5mks)
- 4c. Define the following terms (i) edaphology (ii) pedology (iii) nitrification (iv) ammonification (v) denitrification (6mks)

SECTION C

- 5 (a) Define the following terms (i) Soil (ii) bulk density (iii) soil structure (iv) Climate (v) Permeability (vi) soil texture (vii) Leaching (viii) Erosion, (ix) Ped (x) polypedon (10marks)
- (b) Calculate the proportion of silt fraction in a soil whose sand and clay fractions are 85 and 12%. 5marks
- 6 (a) Given that a soil weighs 1320g, after oven drying, the diameter of the used core sampler is 10cm. By taking particle density to be 2.654 g/cm³. Calculate
- (i) The bulk density of the soil (3 marks)
 - (ii) Total porosity of the soil (2 marks)
 - (iii) Suggest a possible effect of the bulk density on the soil (1 mark). **Show all working**
- (6b) On a tree diagramme show the classification of soil structure (9 marks).