

127

FEDERAL UNIVERSITY OF TECHNOLOGY, OWERRI
DEPT. OF SOIL SCIENCE AND TECHNOLOGY

RAIN SEMESTER EXAMINATIONS FOR 2010/2011 SESSION
COURSE CODE: SST 504 (SOIL AND PLANT ANALYSIS)

INSTRUCTIONS: Answer **four** questions with at least two questions from each section. TIME: 3HRS

SECTION A:

QUESTION 1.

Calculate the amount of salt required to prepare the following:

- a) 0.26N $K_2Cr_2O_7$ (potassium dichromate) in 2 litres of distilled water.
- b) 0.5N H_3BO_3 (Boric acid) in a litre of water
- c) 500ml of 0.1M (molar) Na_2CO_3
- d) 0.002M (molar) of $CaCl_2$ in 10 litres of water

QUESTION 2

Discuss the determination of the following soil properties in the laboratory:

- (a) Soil texture
- (b) Soil reaction

QUESTION 3

- (a) Outline the steps/procedures taken in preparing a soil sample for laboratory analysis after sampling
- (b) Name 2 methods of soil sampling in the field

SECTION B:

QUESTION 4

- (a) What is spectrophotometry? (b) Explain the principle behind the operation of a U-V spectrophotometer. (c) Explain: (i) Beer's law (ii) Lambert's law and (iii) Beer-Lambert's law

QUESTION 5

- (a) You are provided with a sodium chloride salt, explain fully how you can prepare (i) a stock solution containing 1000 ppm Na (ii) standard solutions containing: 5, 10, 15, 20 and 25 ppm Na.

- (b) Assuming the respective emissions of the standard solutions in 5 aii above during flame photometric analysis are 0.150, 0.201, 0.252, 0.301 and 0.351. Calculate the % Na content of a plant sample with emission of 0.342.

(Hint: weight of sample ashed = 0.5g, volume of sample solution = 100ml)

QUESTION 6

- (a)(i) List 5 extractant that can be used in soil analysis and mention the element(s) or compounds the can extract.

- (ii) Differentiate between deionized water and distilled water

- (b) What is the significance of the blank titration in soil organic carbon determination by Walkley Black method and explain while the blank titre value is always higher than the sample titre value.

- (c) Give three disadvantages and two advantages of wet oxidation method of preparing plant samples for elemental analysis.

- (d) With appropriate diagram explain the operational principle of a flame photometer.