

Federal University of Technology, Owerri
School of Agriculture and Agricultural Technology
Department of Soil Science and Technology

Rain Semester Examination

2014/2015 Session

Soil and plant analysis

SST 504

Time Allowed

3hrs

Instruction to Candidates: Answer question one and four other questions.

1(a) Briefly explain the importance of : (i) Blanks (ii) Sample labeling and (iii) calibration of pH meters in laboratory experiments. (6 marks)

(b) List ten (10) laboratory equipments and their use(s). (10 marks).

(c) Mention any two catalysts that can be used for digestion in total N determination in soils (2 marks).

(d) State the role of (i) 1N NaOH and (ii) ammonium buffer solution in EDTA titrations. (2 marks)

2(a) Rearrange in order, copy, complete and balance these equations and use them to explain the process involved in the determination of N using the Regular Micro Kjeldal method



(b) Use the following data below to calculate the % crude protein of a plant sample:

Weight of sample digested = 0.516 g

Final volume of digested sample = 100 cm³

Volume of sample used for distillation = 10 cm³

Normality of HCl = 0.05

Sample titre value = 1.258 cm³

Blank titre value = 0.050 cm³ (6 marks)

3. You are provided with copper II sulphate pentahydrate salt. Explain fully how you will prepare (i) a solution containing 1000ppm Cu (ii) working solutions containing 0,5,10,15,20, and 25 ppmCu using 100 cm³ volumetric flasks. (Hints: Cu = 63.54, S = 32.064, O = 16, H = 1) (20 MARKS)

4(a) Compare and contrast two named methods for preparing plant samples for elemental analysis (10 marks)

(b) Use the following data obtained during Ca and Mg determinations using EDTA titration method to calculate the amount of Ca and Mg in % and in ppm in the sample.

Volume in cm^3

	Ca + mg	Ca
Sample titre value	6.50	4.35
Blank titre value	0.50	0.15

Volume of sample used for titration = 5.0 cm^3

Weight of sample used for digestion = 0.060 g

Final volume of digested sample = 50 cm^3 (10 marks)

5(a) Explain the principle behind the U-V spectrophotometer (10 mark)

(b) 1.0 g of paw-paw seed was weighed for elemental analysis using an appropriate procedure. The sample was made up to 100 cm^3 in a volumetric flask. The P standard absorbance and that of the sample is given below:

Conc. (ppm P)	0.00	0.20	0.40	0.60	0.80	1.00	sample
Absorbance	0.020	0.041	0.059	0.080	0.099	0.121	$0.077 \times 10DF$

(10MARKS)

6(a) Explain the principle of flame Emission spectroscopy (8 marks)

(b) Using a solution containing Potassium Chloride, explain the events that take place in a flame photometer. (10 marks)

(c) Differentiate between sterile distilled water and distilled water. Give example where each can be used. (2 marks)

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