OF TECHNOLOGY OWERRI
School of Agricultu and Agricultural Technology
Department of Soil Science and Technology
Harmattan semester examinations 2016/2017

SST 301: SOIL CHEMISTRY AND FERTILITY : CREDIT UNIT: 2 UNITS

TIME: 21/2 HOURS

Instruction: Answer 5 questions in all and not less than 2 questions from each section

SECTION A

1(a) Define soil according to
(i) An agronomist (ii) A pedologist (iii) An engineer

(b) List the three (3) types of rocks

(c) Explain any two (2) types listed above.

2 (a) Define the term mineral

(i) List and explain the two types of minerals.

(ii) Give three examples of each type listed above

3(a) Explain the origin of clay minerals

(b) Explain the formation of clay minerals

(4) Write short note on the following groups of clay minerals

(i) Kaolin group

(ii) Hydrous group (iii) montmorrillonite group (iv) chlorite group

SECTION B

5(a) Write short note on the following

(i) strongly acidic soil (ii) volatilization loss of nutrients

(iii) fertilizer grade (iv) vermicomposting (v) nutrient loss through erosion

(b) List and explain the factors that affect leaching of nutrients in the soil.

6(a) Explain the factors that can encourage increase in soil acidity in tropical soils

(b) Define organic manure and enumerate its importance to the soil.

(7) As a Soil scientist, you are to carry out a research work on soyabean production in the field. Your recommendation rates are 30 kg N/ha, 40kg P_2O_5/ha and 50 kg K_2O/ha. The fertilizer to be used are urea (45 %N), single super phosphate (18 % P_2O_5) and muriate of potash (60 % K_2O). If your plot size is 4m x 20m, what are the quantities of each fertilizer material required.

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FEDERAL UNIVERSITY OF TECHNOLOGY OWERRI
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Department of Soil Science and Technology
Harmattan Semester Examinations 2018/2019

SST 301: SOIL CHEMISTRY AND FERTILITY: CREDIT UNITS: 2 UNITS

Time: 2 ½ HOURS

Instruction: Answer 4 questions in all. At least 2 questions from each section

SECTION A

1(a) Define isomorphous substitution 3 marks

(b) With aid of a diagram, show isomorphic substitution in 1: 1 clay mineral and 2: 1 clay Mineral 12 marks

2 (a) Write short notes on the following clay mineral groups.

(i) Kaoline group (ii) Hydrous mica group (iii) montmorrilonite group (v) Chlorite group 7 marks

(b) with the aid of a diagram, explain soil composition.

3 (a) Define the following terms

(i) Plant nutrients 2 marks
(ii) Nutrient mineralization 2 marks
(iii) Nutrient immobilization 2 marks
(iv) Nutrient dynamics or chemistry 2 marks

(b) Discuss the chemistry of potassium 7 marks

SECTION B

4 Loss of plant nutrients in the soil can be caused by so many factors. List and explain. 15 marks

5 (a) Write short notes on the following

(i) Soil acidity 2marks
(ii) Leaching of plant nutrient 2 marks
(iii) Thermophylic composting 2 marks
(iv) Split application mettod of fertilization 2 marks
(v) Animal bedding litter 2 marks
(vi) Fertilizer requirement 2 marks

b Differentiate between fertilizer carrier and fertilizer grade 3 marks

6 How would you prepare 18kg of 4-10-8 fertilizer mixture using sulphate of ammonia (21% of N), SSP (18% OF P_2O_5) and 60 % K_2O 15 marks