

Federal University of Technology, Owerri  
 School of Agriculture and Agricultural Technology/Post Graduate Studies  
 Department of Soil Science and Technology

Harmattan Semester Examination 2016/2017 Session  
 Field Experiment and Biometry SST 821  
 Time Allowed 3hrs

Instruction to Candidates: Attempt all Questions

Question One

- (a) What do you understand by the term **Research** and explain the relationships between research and Development and research and Experimentation
- (b) State the differences between critical, preliminary and demonstrational experiments and outline five characteristics of good experiments and the purposes of experimentation

Question Two

- (a) Enumerate the differences between a CRD and Latin Square experimental designs
- (b) Explain the term factorial experiment and indicate its merits and demerits
- (c) Demonstrate the treatment combination of a 4 x 5 factorial consisting of 4 levels of N ( $N_0, N_1, N_2,$  and  $N_3$ ) and 5 levels of P ( $P_0, P_1, P_2, P_3$  and  $P_4$ )
- (d) Give the randomization of (c) above for RCBD design replicated 3 times

Question Three

The saloid-P content ( $\text{mg kg}^{-1}$ ) of FLUTO surface soil amended with 8 levels of P ( $P_0, P_1, P_2, P_3, P_4, P_5, P_6$  and  $P_7$ ) fertilizers arranged in CRD with 3 replications is as given. Construct an appropriate ANOVA and determine the differences between treatment means using NDMRT

Treatments	Rep I	Rep II	Rep III
P0	515	560	571
P1	760	740	750
P2	780	790	770
P3	850	840	840
P4	930	940	920
P5	1200	1300	1250
P6	1150	1120	1200
P7	950	960	940

#### Question Four

- (a) What do you understand by the term multiple regression analysis
- (b) A multiple regression analysis was used to determine the relationship between plant height (cm) and tiller number with grain yield (kg ha<sup>-1</sup>) of different cowpea varieties and the following data below were generated. Determine the regression coefficients ( $b_1$  and  $b_2$ ), intercept ( $a$ ), coefficient of determination ( $R^2$ ) and regression equation of the form  $Y = a + b_1X_1 + b_2X_2$ .

Variety No	Grain Yield Y	Plant height X1	Tiller No. X2
1	3751	110.5	15
2	4376	105.4	16
3	5467	118.1	14
4	5844	104.5	18
5	6361	93.6	15
6	6582	84.1	17
7	7439	77.8	18
8	7619	75.6	19

#### Question Five

Tuber yields of yam amended with 8 soil amendments in RCBD replicated 4 times gave the data below. Construct an appropriate ANOVA Table and determine the differences between treatment means using LSD at 1 and 5% probability levels

Treatments	Rep I	Rep II	Rep III	Rep IV
Control	1192	1652	1075	1030
NPK	2233	2743	2727	
Pig dung	2952	2272	2479	
Poultry waste	2797	3021	2585	3490
Cow dung	2858	2895	2458	1723
Pig dung + NPK	3103	1788	2248	2115
Poultry waste + NPK	3202	3060	2240	2690
Cow dung + NPK	3390	2875	2775	