FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA
SCHOOL OF SCIENCE AND SCIENCE EDUCATION
DEPARTMENT OF GEOGRAPHY

FIRST SEMESTER 2012/2013 SESSION UNDERGRADUATE EXAMINATION

COURSE CODE: GRY 417P

COURSE TITLE: Advanced Quantitative Techniques

INSTRUCTIONS: Answer any **FOUR** questions. **Time allowed**: 3 hours

1. A curious and bright undergraduate student carried out an investigation of a possible link between the size and wall colours of professor's offices and their research output. He constructed a reliable and valid measure to quantify the productivity and used it to gather the following data; the higher the number, the greater was the professor's research output:

Size/Colour	Green	Purple	Grey	Blue
Small	70 75	80 60	120 135	160 100
Medium	175 160	165 160	185 128	150 141
Large	140 156	180 185	79 83	66 60

   a. What is the average productivity of the professors?

   b. Do the size of offices and colours affect the professors research output?

   c. If your answer to (b) above is yes, which combination of room colour and size is more conducive to professors' research output?

2. (a) In an investigation of student's spelling, a language instructor decided to look at the importance of two psycholinguistic variables; age of pupil and word length. The table below gives the result obtained from 10 students of a particular class.

Age of student	10	12	13	16	18	18	12	13	16	14
Length of word	20	25	18	20	15	48	22	30	48	14

(i) What can you say about the length of word that could be spelt by a student and his/her age?

(ii) What are the mean age, the modal word length and the median word length of the student in the Table?

3. The performance of a student in an examination was found to depend upon the number of hours used in studying and the number of lectures he attends according to the equation:

$P = a + b1S + b2L$

Experimental data are obtained in order to find the coefficient of the multiple regression a, b_1 and b_2 by the method of least squares. Summing over the relevant values gives the following three equations which have to be solved.

$2a + 3b1 + 4b2 - 12 = 0$

$5a - 4b1 + 6b2 - 3 = 0$

$2a + 4b1 - 8b2 - 2 = 0$

Use determinants or otherwise to find the values of a b_1 and b_2.

4. (a) A man travels from Minna to Bida a distance of 80km at an average speed of 100km/h and returns along the same route at an average speed of 90km/h. What is his average speed for the entire journey (Minna-Bida – Minna)

(b) The monthly salaries in Naira (₦) of a group of men are: 540, 580, 620, 700, 830, 910, 700, 830, 840, and 1000.

(i) What is the range of the salary?

(ii) Calculate the mean and Standard deviation of the salaries to the nearest ₦1, 000.00.

5. (a) The Table below gives the frequency distribution of the lives of 50 car batteries to days, to the nearest day.

Days	350	360	370	380	390	400	410	420
Frequency	1	3	3	7	12	11	6	5

(i) Construct a cumulative frequency table and use it to draw a cumulative frequency curve (Ogive)

(ii) Use the ogive to estimate the following

i. The median

ii. The first and third quartile

iii. The semi-interquatile range

5(b) Write the first- order regression equation for each of the following:

i. One quantitative independent variable

ii. Two quantitative independent variables

iii. Five quantitative independent variables

6. Discuss the roles of Quantitative Techniques in Geographical Research.