BACHELOR OF SCIENCE HONOURS DEGREE IN REGIONAL AND URBAN PLANNING

LEVEL 1 SEMESTER 1

EXAMINATION PAPER

MODULE CODE	**RUPH 112**
MODULE NARRATION	**STATISTICS FOR PLANNERS**
DATE	**2024**
DURATION	**2 HOURS**

INSTRUCTIONS TO CANDIDATES:

1. **Answer any three questions.**
2. **Each question carries 25 marks.**
3. **Show all your formulae and calculations. Credit is given for orderly presented calculations.**

ADDITIONAL MATERIALS

Graph paper, ruler, sharp pencil, calculator, statistical tables and list of formulae

1(a). The ninth term of arithmetic progression is 22 and the sum of the first 4 terms is 49

(i) Find the first term of the progression and the common difference.

If the *n*th term of the progression is 46

(ii) Find the value of n [6 marks]

(b) An Arithmetic Progression contains 25 terms and the first term is -15. The sum of all the terms is 525. Calculate

(i) The common difference of the progression

(ii) the last term of the progression [7 marks]

(c) Solve the following simultaneous equations

(i) $2x + 13y = 36$

$13x + 2y = 69$ [3 marks]

(ii) $7x - y = 15$

$3x - 2y = 19$ [3 marks]

(iii) $7x + y = 25$

$5x - y = 11$ [3 marks]

(iv) $8x + 9y = 3$

$x + y = 0$ [3 marks]

2. An architect carried out a survey on the average number of days required to complete a building by using forty (40) different construction companies and the following data was obtained and recorded below.

56 20 45 70 50 49 62 39 41 65 25 76 59 48 55 57 71 49 42 44
63 60 40 45 50 31 35 21 58 56 54 56 63 30 39 28 49 53 64 66

(a) Represent the information on a stem and leaf diagram. [8 marks]

(b) Calculate the semi- interquartile range. [4 marks]

(c) Construct a frequency distribution by grouping the data into classes of 20–29, 30–39, 40–49,etc [7 marks]

(d) Using the data you have grouped on **(c)** above, calculate

(i) mean [3 marks]

(ii) mode [3 marks]

3(a) Ten students wrote two tests and obtained the following scores;

Pupil	A	B	C	D	E	F	G	H	I	J
Test 1	25	38	35	30	20	30	40	25	35	25
Test 2	30	46	50	48	26	36	40	31	40	32

(a) Calculate Pearson's product moment correlation coefficient and comment on it. [25 marks].

4(a) What is the difference between a Chi-square test of association and a Chi-square Goodness of fit test? [7 marks]

(b) A real estate company made an investigation on the association of the bank that availed the mortgage loan to the location of house packages bought. New house owners chosen at random were asked the bank they took the mortgage loan and the location of house packages they bought. The Table 1.1 below shows the sample results of the survey:

Table 1.1: Bank and location of house packages

	Location		
Bank	Westlea	Vainona	Eastview
CABS	205	248	328
NEDBANK	182	251	281

As a researcher, test at 5% level of significance whether there is a relationship between the type of bank and the location of house packages bought and write a brief report commenting on your findings. [18 marks]

5. (a) (i) Explain the two prominent relationships between variables in scatter diagrams. [6marks]

(ii) Describe any two relationships which you can analyse using the cause- effect approach [4 marks]

(b) The marks obtained by 10 candidates in statistics and pure mathematics in a certain year are shown in Table 1.2 below:

Table 1.2: Marks obtained by students

Statistics (x)	74	46	30	60	80	52	67	20	64	73
Pure Mathematics(y)	70	40	18	42	81	35	40	08	72	68

i. Plot on a scatter diagram the Statistics mark (x) against the pure mathematics mark (y) and comment on the relationship. [5 marks]

ii. Find an estimate of the regression equation which best fits the data. [6 marks]

iii. Compute the estimated mark for pure mathematics for a candidate who got 65% in statistics. [4 marks]

END OF PAPER