



PAN AFRICA CHRISTIAN UNIVERSITY

BACHELORS OF COMMERCE

SEPTEMBER-DECEMBER 2022

DEPARTMENT: BUSINESS STATISTICS II

COURSE CODE: BCM 204

COURSE TITLE: BUSINESS MATHEMATICS (ROYSAMBU)

EXAM DATE:

TIME:

INSTRUCTIONS

- Read all questions carefully before attempting.
- Question **One** is **compulsory** i.e Section **A** is **compulsory**
- Answer any **THREE** Questions in Section **B**
- Write your **student number** on the answer booklet provided.

QUESTION ONE- COMPULSORY**(10 MARKS)**

A group of 25 students took examinations in both pure mathematics and statistics. Their marks out of 150 in mathematics, x , and in statistics, y , were recorded and are summarised below.

$$\sum x = 1978, \sum x^2 = 175840 \quad \sum y = 2123 \quad \sum y^2 = 202257 \quad \sum xy = 181572$$

Required

- i. Calculate
 - a. S_{xx} , (2 marks)
 - b. S_{yy} (2 marks)
 - c. S_{xy} (2 marks)
- ii. Find the product moment correlation coefficient between the marks in pure Mathematics and Statistics, (4marks)

QUESTION TWO**(10 MARKS)**

- a) Differentiate between the following :
 - i. one tailed and two tailed test (2marks)
 - ii. Null and Alternative Hypothesis (2marks)
- b) The breaking strengths of cables produced by manufacturer have a mean of 1800 Kg and a standard deviation of 100 Kg. By a new technique in the manufacturing process, it is claimed that breaking strength can be increased. To test this claim, a sample of 50 cables is tested and it is found that the mean breaking strength is 1850Kg. Do we accept or reject the claim at the 0.01 significance level. (6 marks)

QUESTION THREE**(10 Marks)**

Given that

$$H_0: \mu \leq 15$$

$$H_1: \mu > 15$$

A sample of 40 provides a sample mean of 16.5 and a sample standard deviation of 7

Required:

- i. At $\alpha = 0.02$, what is the critical value for z (4marks)
- ii. The rejection rule (2 mark)
- iii. Compute the value of the test statistics z (4 marks)

QUESTION FOUR**(10 Marks)**

Two computers A and B are to be marketed. A salesman who is assigned the job of finding customers for them has 60% and 40% chances, respectively of succeeding in case of computer A and B. The computers can be sold independently. Determine the probability that computer A has been sold.

QUESTION FIVE**(10 Marks)**

- a) Discuss **four** characteristics of moving averages (4 Marks)
b) State **six** limitations of moving averages. (6 Marks)

QUESTION SIX**(10 Marks)**

- a. Explain the following terms citing relevant examples:
- i. Population (2 Mark)
 - ii. Statistics (2 Marks)
- b. The following data relate to advertising expenditure and their corresponding sales (in millions):

| | | | | | |
|--------------------------------|----|----|----|----|----|
| Advertising expenditure('000) | 10 | 12 | 15 | 23 | 20 |
| Sales('000,000) | 14 | 17 | 23 | 25 | 21 |

- I. Determine the regression line (4 marks)
II. Estimate the sales corresponding to advertising expenditure of shs. 30,000 (2 marks)

FORMULAE

$$\Sigma (x-\bar{x})^2 = \Sigma x_i^2 - \Sigma(x)^2/n$$

$$\Sigma (y-\bar{y})^2 = \Sigma y_i^2 - \Sigma(y)^2/n$$

$$\Sigma (x-\bar{x}) (y-\bar{y}) = \Sigma x_i y_i - \Sigma(x) \Sigma(y)/n$$

$$y^* = a + bx$$

1.

$$b = \frac{n \Sigma xy - (\Sigma x)(\Sigma y)}{n(\Sigma x^2) - (\Sigma x)^2}$$

$$a = \frac{\Sigma y - b \Sigma x}{n}$$

$$r = \frac{n(\Sigma xy) - (\Sigma x)(\Sigma y)}{\sqrt{[n\Sigma x^2 - (\Sigma x)^2][n\Sigma y^2 - (\Sigma y)^2]}}$$