



**CHRISTIAN SERVICE UNIVERSITY COLLEGE  
KUMASI, GHANA**

**FACULTY OF HUMANITIES**

**DEPARTMENT OF PLANNING AND DEVELOPMENT  
DEPARTMENT OF THEOLOGY  
DEPARTMENT OF COMMUNICATION STUDIES**

**END OF FIRST SEMESTER EXAMINATIONS – 2021/2022 ACADEMIC YEAR**

**LEVEL 200**

**DPSD 207 / CSUC 201: QUANTITATIVE METHODS**

**JANUARY 2022**

**70 MARKS**

**TIME ALLOWED: 2 HOURS, 30 MINUTES**

**GENERAL INSTRUCTION TO CANDIDATES:**

- **Indicate your department** on both the question paper and every page of the answer booklet used.
- **Write your index number** on the question paper and every page of the answer booklet used.
- **SUBMIT** both the **question paper** and the **answer booklet** at the end of the examination.
- This Examination contains two (2) sections: Section A and Section B.
- Answer **all questions** in the answer booklet.
- Answer **all questions** in **SECTION A**
- Answer any **TWO (2) QUESTIONS** in **SECTION B**.

***Examiner: Samuel Tawiah Baidoo***

## SECTION A

## ANSWER ALL QUESTIONS (50 MARKS)

1. (a) Sampling methods are categorized into two. State and briefly explain these two methods of sampling. [2 marks]

(b). Briefly explain two types each under each of the category outlined in (a) above. [4 marks]

2. Define the following matrices with appropriate examples

(i) A square matrix

(ii) A diagonal matrix

(iii) An identity matrix

(iv) A null matrix [4 marks]

3. What are the dimensions of the following matrices?

(i)  $D = \begin{pmatrix} 50 & 64 & 52 \\ 11 & 90 & 19 \\ 70 & 2 & 21 \end{pmatrix}$

(ii)  $L = \begin{pmatrix} 200 \\ 180 \end{pmatrix}$

(iii)  $Q = (90 \ 70)$

(iv)  $M = (55 \ 100 \ 120)$  [4 marks]

4. Given matrices A and B, solve  $2A+3B$

$A = \begin{pmatrix} 3 & 7 \\ 2 & 6 \end{pmatrix}$ , and  $B = \begin{pmatrix} 6 & 2 \\ 3 & 4 \end{pmatrix}$  [4 marks]

5. Find the inverse of the following matrix. [4 marks]

$B = \begin{pmatrix} 8 & 3 \\ 5 & 3 \end{pmatrix}$

6. Find the first, second, and third derivatives of the following function: [3 marks]

$y = 2x^6 + 4x^5 - x^4 - 7x^3 + 2x^2 - 4x + 10$

7. Differentiate the following function:  $y = \ln(x^4 - 2x^3 - x^2 + 7x)$  [2 marks]

8. Integrate the following function:  $\int (8x^3 + 2x^2 - 8x + 3)dx$  [2 marks]

9. Distinguish between population and sample [2 marks]
10. What is the difference between sample statistic and population parameter? [2 marks]
11. A researcher wants to know the average weight of CSUC year 3 female students. In doing this, he selects 150 females and calculates their average weight. From the information what are the population, sample, population parameter and sample statistic? [4 marks]
12. Variables are divided into quantitative and qualitative variables. Briefly distinguish between these two variables and provide an example for each of them. [4 marks]
13. Define the following terms in relation to probabilities:
- (i). Experiment
  - (ii). Outcome
  - (iii). Event
  - (iv). Sample space.
- [4 marks]
14. Distinguish between a dependent variable and an independent variable with appropriate examples. [5 marks]

## SECTION B

### ANSWER ANY TWO (2) QUESTIONS (20 MARKS)

1. (a). Suppose the total cost (in thousand Ghana cedis) of S & M Company in Kumasi is given by
- $$TC = 4 + 20Q - Q^2.$$
- (i) Calculate the marginal cost at output Q. [2 marks]
- (ii) Evaluate the total cost at the following output levels:  $Q = 2, 4$ , and  $6$ . [3 marks]
- (b). The marginal revenue (in thousand Ghana cedis) of A & B enterprise in Accra is given by
- $$MR = 60 + 10Q.$$
- (i) Find the total revenue at output Q. [2 marks]
- (ii) Calculate the total revenue at the following output level:  $Q = 3, 5$  and  $2$ . [3 marks]
2. You are a researcher and want to analyze the number of hours CSUC students of Accounting and Finance department study each week. To achieve this you selected a sample of 15 students and asked them how many hours they spent studying in the last week. The responses were as follows:
- 33, 24, 15, 23, 27, 34, 38, 20, 10, 21, 18, 23, 21, 29, and 23.
- (i) What is the population of the study? [1 mark]
- (ii) What is the sample of the study? [1 mark]



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(iii) What is the sample mean hour? [2 marks]

(iv) What is the sample median hour? [2 marks]

(v) What is the mode? [1 mark]

(vi) Briefly explain what is meant by the mean, median and the mode obtained. [3 marks]

3. (a). Suppose 300 tourists visited Ghana in 2019. Available statistics showed that 130 tourists visited Kakum Park and 200 of them visited Paga Crocodile pond. The data further showed that 80 out of the 300 tourists visited both Kakum Park and Paga Crocodile pond. What is the probability that a tourist selected visited either Kakum Park or Paga Crocodile pond? [5 marks]

(b). Suppose the number of bags of rice sold at Kejetia market in the Ashanti region for a sample of 5 days in December 2020 were 20, 40, 50, 60 and 80. Calculate the mean deviation for the number of bags of rice sold and interpret your answer. [5 marks]

4. (a) Suppose you deposit an amount of GHc5000.00 in a savings account and the interest is 5% per year.

(i) Find the simple interest that will be earned in 8 years. [2 marks]

(ii) How much will you earn in total for the 8 years. [1 mark]

(b) What will be the total amount of Ghc500.00 invested at 12% for 10 years compounded yearly? [2 marks]

(c) In a class of 800 students, 130 are males and the remaining are females. Express the number of males and females in the class in percentages. [2 marks]

(d) As a researcher, you asked individuals whether they had jobs after school and the responses are summarized in the following Table 1.

Table 1.

Response	Number
Had a job	70
Did not get a job	90
Total	160

From the responses, calculate the following ratios:

(i) Individuals who had jobs to those who did not get job. [1 mark]

(ii) Individuals who did not get job to the total number of individuals interviewed. [1 mark]

(iii) Individuals who had jobs to the total number of individuals interviewed. [1 mark]

END

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