

JANUARY 2023
MAT 204SW
INTRODUCTION TO PROBABILITY
AND STATISTICS
1 HOUR 20 MINUTES

Candidate	
Signature	IE/MS

UNIVERSITY OF CAPE COAST
COLLEGE OF EDUCATION STUDIES
SCHOOL OF EDUCATIONAL DEVELOPMENT AND OUTREACH
INSTITUTE OF EDUCATION

FIVE-SEMESTER BACHELOR OF EDUCATION (SANDWICH) PROGRAMME
LEVEL 300, END-OF-SECOND SEMESTER EXAMINATIONS, JANUARY 2023

9TH JANUARY 2023 INTRODUCTION TO PROBABILITY 9:30 AM - 10:50 AM
AND STATISTICS

SECTION B
(60 Marks)

Answer any THREE questions in this Section.

1. a. The table below shows the marks obtained by students in a quiz and end of semester examination.

Quiz (x)	10	10	11	12	12
End of semester examination (y)	5	6	4	3	3

- i. Calculate the Pearson product moment correlation coefficient between quiz and end-of-semester examination. [10 marks]
ii. Interpret your result in (i) above and state the conclusion that can be drawn from the result. [4 marks]
- b. The set of numbers $x^2, 3, 3x - 4, 7, 9$, where x is a positive integer, has a mean of 5. Find the value of x . [6 marks]

2. a. A fair die is tossed once. If a 3 or 4 appears, a ball is drawn from box I, otherwise a ball is drawn from box II. Box I contain 4 red and 2 white balls. Box II contains 2 red and 4 white balls.

Find the probability that;

- i. box I is used and a white ball is drawn [6 marks]
ii. box II is used and a white ball is drawn [6 marks]

iii. a white ball is drawn [3 marks]

b. Ten entries are submitted for competition. Two judges study each entry and list the ten in rank order. The following are the summary statistics: $\sum d^2 = 48$ and $n = 10$. Calculate the Spearman's rank correlation coefficient. [5 marks]

3.

a. The table below gives the marks scored in an examination by certain students

Marks %	10-29	30-39	40-49	50-59	60-69	70-79	80-99
Frequency	14	30	26	14	10	4	2

i. Draw a histogram to illustrate the information [12 marks]

ii. Use your histogram to estimate the mode [4 marks]

b. The average annual rainfall in Cape Coast for 1976 – 1970 was 26 inches per year. Cape Coast received 24 inches of rain in 1976, 30 inches in 1977, and 19 inches in 1978. How many inches of rainfall did Cape Coast receive in 1979? [4 marks]

4.

a. A committee of three is chosen from four teachers and three students. In how many ways can this be done so that the committee contains;

i. at least one teacher [5 marks]

ii. at least one teacher and one student. [5 marks]

c. If $\frac{{}^nC_5}{{}^nP_4} = \frac{1}{4}$, find the value of n . [5 marks]

d. On Thursday, 20 out of the 25 students in a Statistics class took a test and their mean score was 80. On Friday, the other 5 students took the test and their mean score was 90. Calculate the mean score of the entire class [5 marks]

5.

a. It is known that 52% of Post diploma students participate in sport on a regular basis. Five randomly selected students are interviewed and asked whether they participate in sport on a regular basis. Let X be the number of people who regularly participate in sport.

(i) Construct a probability distribution for the random variable X . [10 marks]

(ii) Find the probability that at least one person participates in sport, given that no more than three students participate in sport. [6 marks]

b. The deviation from the mean of a set of numbers are $(x + 3)^2$, $(x + 7)$, -2 , x and $(x + 2)^2$, where x is a constant. Find the value of x if the mean deviation is zero.

[4 marks]