APRIL 2022
MAT 204SW
INTRODUCTION TO PROBABILITY
AND STATISTICS
40 MINUTES

Candidate's Index Number
IE/MAT/KIS/21/00798
Signature:

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, SECOND SEMESTER QUIZ 1, APRIL 2022

APRIL 19, 2022 **INTRODUCTION TO PROBABILITY AND STATISTICS** **7:30 AM - 8:10 AM**

Answer ALL questions.

1. Given that A, B, C and D are events for which $P(A \text{ or } B) = 0.6$, $P(A) = 0.2$, $P(C \text{ or } D) = 0.6$ and $P(C) = 0.5$. The events A and B are mutually exclusive and the events C and D are independent. Find:
   i. $P(B)$ **[2 marks]**
   ii. $P(D)$ **[2 marks]**

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

3. 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. **[3 *marks*]**
   ii. at least one teacher and one student. **[3 *marks*]**

4. A fair die is tossed 144 times and the number of fives obtained is recorded. Find the:
   i. mean of the expected number of fives. **[3 *marks*]**
   ii. standard deviation for the number of fives. **[3 *marks*]**

APRIL 2022
MAT 204SW
INTRODUCTION TO PROBABILITY AND STATISTICS
1 HOUR 20 MINUTES

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FIVE-SEMESTER BACHELOR OF EDUCATION (SANDWICH) PROGRAMME
LEVEL 300/350, END-OF-FIRST/SECOND SEMESTER EXAMINATIONS, APRIL 2022

APRIL 26, 2022 **INTRODUCTION TO PROBABILITY AND STATISTICS** **9:40 AM - 11:00 AM**

SECTION B
(60 Marks)

Answer any THREE questions in this Section.

1.

a. The following are scores obtained by twenty-four students in a statistics examination;

35	39	33	46
49	55	56	58
40	59	56	41
64	73	71	88
66	81	51	52
68	54	61	42

i. Construct a stem and leaf plot for the scores obtained. **[6 marks]**
ii. Comment on the skewness of the scores and its implication on the performance of the class. **[4 marks]**
iii. Find the 20^{th} percentile and interpret it about other students in the class. **[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]**

3.5

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 contains 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 **[7 marks]**

ii. box II is used and a white ball is drawn **[6 marks]**

iii. a white ball is drawn **[4 *marks*]**

b. A hotline with a toll-free number receives an average of 4 calls per hour. For any given hour, find the probability that it will receive exactly 6 calls **[3 *marks*]**

3.

a. The following are the marks obtained by eight students in Statistics and Calculus in an examinations.

Statistics (x)	67	42	85	51	39	97	81	70
Calculus (y)	70	59	71	38	55	62	80	76

i. Calculate the Spearman's rank correlation coefficient between x and y. **[11 *marks*]**

ii. Interpret your result in (i) above and state the conclusion that can be drawn from the result. **[4 *marks*]**

b. In a class of 25 students, 6 study Mathematics, 14 study Biology and 3 study both subjects. Find the probability that a student selected at random does not study any of the two subjects **[5 *marks*]**

4. 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

a.

i. Draw a histogram to illustrate the information **[9 *marks*]**

ii. Use your histogram to estimate the mode **[3 *marks*]**

b. The mean commuting time between a student's home and the study center is 18 minutes. The standard deviation is 2 minutes. Assume the variable is normally distributed. Find the probability that it takes a student between 18 and 22 minutes to get to the study center. **[8 *marks*]**

5.

a. A die is tossed 144 times and the number of fives obtained is recorded.

α) Find the probability of getting;

i. 24 fives [3 marks]

ii. at least 3 fives [7 marks]

β) Calculate the;

i. expected number of fives [2 marks]

ii. Variance of the expected fives. [2 marks]

b. The maximum load that a lift can take is 950kg. If 5 men with a mean weight of 61kg and 12 women with a mean weight of 52kg take the lift, determine whether their total weight exceeds the maximum load. [6 marks]