



MAASAI MARA UNIVERSITY
REGULAR UNIVERSITY EXAMINATIONS
2022/2023

SCHOOL OF BUSINESS AND ECONOMICS
BACHELOR'S OF SCIENCE IN ECONOMICS
AND STATISTICS
FIRST YEAR SECOND SEMESTER

COURSE CODE: ECS 1203-1

**COURSE TITLE: PROBABILITY AND
DISTRIBUTION THEORY**

DATE:

TIME:

INSTRUCTIONS:

Attempt Question One and any other Two Questions

Question One

- a. A car insurance broker found that the number of policy sales follows a Poisson distributed with an average of three car insurance policies sold per week. Calculate the probability that in a given week
- He does not sell any policy. (2 marks)
 - He sells at most 4 policies. (3 marks)
 - He sells more than 4 policies. (2 marks)
- b. In a game of cards each player is supplied with 4 cards from a group of well shuffled standard deck of card. Determine the probability that out of the 4 cards given to a player.
- Two are flower cards. (2 marks)
 - Two are flowers, 1 is diamond and 1 is heart card. (3 marks)
 - Two of the cards are numbers. (2 marks)
- c. The sales made by a company each month was determined to be as distributed in the table below;

Sales	1000 - 5000	5000 - 10000	10000 - 15000	15000 - 20000	20000 - 40000
Probability	2c	2.5c	3c	1.5c	c

Determine.

- The value of C. (2 marks)
- The quarterly standard deviation in sales for the company. (4 marks)

Question Two

A random variable X has a probability density function given as

$$f(X) = \begin{cases} kx(1-x) & 0 \leq x \leq 1 \\ 0 & \text{elsewhere} \end{cases}$$

Determine;

- Value of k . (3 marks)
- $E(X)$. (3 marks)
- $F(X)$. (3 marks)
- Median of X. (2 marks)
- Interquartile Range. (4 marks)

Question Three

A discrete random variable X has a p.m.f given by

$$f(X) = \begin{cases} c\left(\frac{3}{10}\right)^x & x = 0,1,2,3,\dots \\ 0 & \text{otherwise} \end{cases}$$

Determine;

- a. The values of c . (3 marks)
- b. $\Pr(X > 4)$. (3 marks)
- c. $M(t)$. (3 marks)
- d. $E(X)$ using $M(t)$. (3 marks)
- e. $\text{var}(X)$ using $M(t)$. (3 marks)

Question Four

For a random variable X with pdf.

$$f(x) = \begin{cases} 2x & 0 \leq x \leq 1 \\ 0 & \text{otherwise} \end{cases}$$

Determine

- a. $\Pr(0.5 \leq x \leq 0.8)$. (2 marks)
- b. Probability density function of $Y = 2\ln(x)$. (4 marks)
- c. $\Pr(Y > -150)$. (3 marks)
- d. $F(Y)$. (3 marks)
- e. $M(t)$. (3 marks)

END

ALL THE BEST