MTC TWO
S. 6 TERM TWO 2024
TEST 4
TIME: 1 ½ Hrs
TOPIC: DISCRETE & CONTINOUS RANDOM VARIABLES

INSTRUCTIONS
Attempt any **four** questions.

1. The p.d.f of a discrete random variable X is as follows;

- discrete variables
- continuous variables
- cumulative variables

$$P(X = x) = \begin{cases} \beta x, x = 1,2,3 \\ \beta (x+1)x = 4,5 \\ 0, \text{otherwise} \end{cases}$$

Find;
a) The value of β
b) P (2≤ x <5)
c) Mode and median of x
d) E (x)
e) Var (Y) if Y = 2x -1

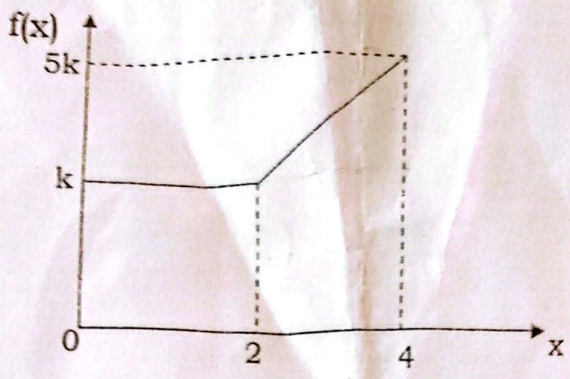
2. A random variable Y has a cumulative distribution function, F(y) given below

$$F(y) = \begin{cases} 0 & : y \le -1 \\ k(y+1) & : -1 \le y \le 0 \\ k(2y+1) & : 0 \le y \le 1 \\ 3k & : y \ge 1 \end{cases}$$

Determine the;
i) Value of K
ii) P.d.f of y

iii) Mean μ
iv) $p(|y - \mu)| < \frac{1}{3})$

3. The p.d.f of a continuous random variable X is distributed as follows;



Find;

i) The value of K
ii) The equation of the p.d.f
iii) P(1< x < 3)
iv) The cumulative distribution function F(x) and sketch it.

4. a) A random variable has a distribution of the form,

$$f(x) = C\left(\frac{4}{5}\right)^x, \quad x = 0, 1, 2, \ldots\ldots\ldots\ldots,$$

Find;

i) C
ii) $P(x \geq \frac{2}{x} \leq 6)$

b) okello played 15 chess games. The probability that he wins a game is 0.6.

i) Find the probability that he won between 6 to 10 games.
ii) Calculate the most likely number of games he won.

END