

The Open University of Sri Lanka
 B.Sc/B.Ed. DEGREE, CONTINUING EDUCATION PROGRAMME
 Open Book Test - 2023/2024
 Level 04 - Applied Mathematics
 ADU4300/ADE4300– Statistical Distribution Theory



Duration: - one hour

DATE: - 16-07-2023

Time: - 9.00 a.m. – 10.00 a.m.

Answer all questions

(1)

Suppose Continuous random variable X has a density function

$$f_X(x) = \begin{cases} cx^2 & ; |x| < 2 \\ 0 & ; \text{otherwise} \end{cases}$$

- (i) Find the value of c .
- (ii) Find the Probability of $|x| < 1$.
- (iii) Find the mean of X .
- (iv) Find the Variance of X .
- (v) Find the lowest value of highest 25% of X .
- (vi) Find the mean and the variance of $3X + 3$.

(2)

(a) Suppose it is known that 5% of adults who take a certain medication experience negative side effects.

A sample is drawn from patients who have taken the medication.

- I. Suppose 20 patients were checked for negative side effects.
 - (i) Find the probability of none of them experience negative side effects.
 - (ii) Find the probability of three to six of them experience negative side effects.
- II. Suppose we check the patients one by one.
 - (i) Find the probability that first detect of the patient with the experience in negative side effects is the 3rd checked patent.

- (ii) Find the probability that third detect of the patient with the experience in negative side effects is the 10th checked patent.
- (b) Average Number of network failures per week in a certain company is 2. Find the probability of less than 5 network failures in three weeks' time.