



ECHELON INSTITUTE OF TECHNOLOGY

Department of BCA

Title of Assignment: Random Variables and distribution functions

Course: BCA -DS III Semester

Session: 2023-24

Date of Issue: 12 August 2023.

Date of Submission: 14th August, 2023

Course Unit included: 1st

Max. Marks: 30

Assignment Number: 1st

Learning Outcomes:

LO1: To understand Basic Concept of Discrete and continuous random variables

LO2: To get solution of Probability mass Distribution

LO3: To Understand the Concept of discrete and continuous probability distribution.

Question-1

If a coin is tossed two times, find the probability distribution for getting heads.

Question-2

$X = x$	0	1	2	3	4
$P(X = x)$	1/16	4/16	6/16	4/16	1/16

Question-3 .

Explain the sample space, events, Random variables and types of random variables

ECHELON INSTITUTE OF TECHNOLOGY

Department of computer Applications

Assignment: 01 (probability & statistics)

1st Assignment

Course: BCA (Data Science)

Semester: 3rd

Date of Issue: 4 Sept.2023

Session: July-Dec 2023

Max. Marks: 30

Date of Submission: 8 Sept.2023

Short answer type questions

Q1. Explain :-

- I. Distribution function
- II. Random variable
- III. probability mass function
- IV. Probability Density function (4)

Q2. Find Mean and Moment generating function of Binomial distribution. (4)

Q3. The diameter of an electric cable, say x is assumed to be a continuous random variable with $p.d.f (x) = 6x(1 - x), 0 \leq x \leq 1$.check the above $p.d.f$ (2)

Long answer type question

Q4. Let x be continuous random variable with *p. d. f*

$$F(x) = \begin{cases} ax & , & 0 \leq x \leq 1 \\ a & , & 1 \leq x \leq 2 \\ -ax + 3a & , & 2 \leq x \leq 3 \\ 0 & , & \text{else where} \end{cases}$$

i) Determine constant a

ii) Compute $P(X \leq 1.5)$

(10)

Q5. prove that if F is distribution function of one-dimensional random variable X , then.

$$F(-\infty) = \lim_{x \rightarrow -\infty} F(x) = 0$$

$$F(\infty) = \lim_{x \rightarrow \infty} F(x) = 1 \quad (10)$$

ECHELON INSTITUTE OF TECHNOLOGY

Department of computer Applications

Assignment :02(Probability & Statistics)

Course :BCA (DATA SCIENCE)

session :July -Dec 2023

Semester :3rd

Max. marks :30

Date of issue: 18.09.23
22.09.23

Date of submission :

Short answer type question

Q1. Explain :

- i) Correlation coefficient.
- ii) Regression.
- iii) correlation
- iv) positive & negative correlation. (4)

Q2. Define Karl Pearson's coefficient of correlation and its formula. (2)

Q3.Explain formula for:

- i) fitting a straight line
- ii) parabola
- iii) power curve
- iv) Exponential curves. (4)

Long answer type question

Q5. Calculate the correlation coefficients for the following heights (in inches) of fathers (X) and their sons (Y):

X	65	66	67	67	68	69	70	72	Total:544
Y	67	68	65	68	72	72	69	71	Total:552

Q6. Fit an exponential curve of the form $Y=ab^x$ to the following data :

X	1	2	3	4	5	6	7	8
Y	1.0	1.2	1.8	2.5	3.6	4.7	6.6	9.1

ECHELON INSTITUTE OF TECHNOLOGY

Department of computer Applications

Assignment :03(Probability & Statistics)

Course :BCA (DATA SCIENCE)

session :July -Dec 2023

Semester :3rd

Max. marks :30

Date of issue:

Date of submission :

Short answer type question

Q1. Define arithmetic mean and its merits and demerits.(4)

Q2. Explain formula of median and find the median for the following distribution :

x	1	2	3	4	5	6	7	8	9
f	8	10	11	16	20	25	15	9	6

(3)

Q3. Explain :

i) Skewness

ii) Kurtosis .(2)

Q4. Define Geometric mean.(1)

Long answer type question

Q5. Calculate :

i) Quartile deviation (Q.D)

ii) Mean deviation (M.D) From mean from the following data:

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70
No. of students	6	5	8	15	7	6	8

(10)

Q6. Calculate the first four moments of the following distribution about the mean and hence β_1 and β_2 .

x	0	1	2	3	4	5	6	7	8
f	1	8	28	56	70	56	28	8	1

(10)

ECHELON INSTITUTE OF TECHNOLOGY
Department of computer Applications

Assignment: 04 (probability & statistics)

Course: BCA (Data Science)

Session:

July-Dec 2023

Semester: 3rd

Max. Marks: 30

Date of Issue: 27/10/2023

Date of Submission: 3/11/23

Short answer type questions

Q1. If X and Y are random variables, then $E(X+Y)=E(X)+E(Y)$ provided all the expectations exist. (2)

Q2. An urn contains 7 white and 3 red balls. Two balls are drawn, together at random from this urn. compute the probability of getting one white. Also find the probability of getting one white and one red ball. Hence compute the expected number of white balls drawn.

(3)

Q3. Define:

i) Moment generating function.

ii) marginal distribution.

iii) Conditional distribution.

(3)

Q4. State properties of Moment generating function.

(2)

Long answer type questions

Q5. In four tosses of a coin, let X be the number of heads. Tabulate the 16 possible Outcomes with the corresponding values of X . By simple counting, derive the probability distribution of X and hence calculate the expected value of X .

(7)

Q6. Let the r.v of X assume the values ' r ' with the probability law:

$PX=r = q^{r-1}p$; $r=1,2,\dots$ find the m.g.f of X and hence its mean and variance.

(6)

Q7. The joint probability density function of a two-dimensional random variable (X,Y) is given by:

$f_{xy} = \begin{cases} 2 & ; 0 < x < 1, 0 < y < x; 0 \\ & ; \text{else where} \end{cases}$

i) find the marginal density function of X and Y .

ii) find the conditional density function of Y given $X=x$ and conditional density function of X given $Y=y$.

iii) check for independence of X and Y .
(7)