Roll No. | | | | | | | | | | | | | **Total No. of Pages : 03**

Total No. of Questions : 09

B.Tech. (Artificial Intelligence & Machine Learning/Artificial Intelligence and Data Science/Artificial Intelligence/Computer Science & Engineering) / B.Tech. (Computer Science & Engg.) (Artificial Intelligence & Machine Learning/Cyber Security/Data Science/IOT) / B.Tech. CSE (Internet of Things and Cyber Security including Block Chain Technology/Data Science/IT)

(Sem.–2)

MATHEMATICS-II

Subject Code : BTAM204-18

M.Code : 91960

Date of Examination : 18-07-22

Time : 3 Hrs. **Max. Marks : 60**

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION - B & C have FOUR questions each.**
3. **Attempt any FIVE questions from SECTION B & C carrying EIGHT marks each.**
4. **Select atleast TWO questions from SECTION - B & C.**

SECTION-A

1. Write short notes on :

a) The mean of 10 numbers is 7 and the mean of 15 other numbers is 12. Determine the mean of 25 numbers taken together.

b) What is skewness? How does it differ from Kurtosis?

c) Find the expectation of the number on a dice when thrown.

d) If a leap year is selected at random, what is the chance that it will contain 53 Tuesdays?

e) Bring out the fallacy, if any, in the following statement:

"The mean of a Poisson distribution is 5 while its standard deviation is 4".

f) If $n = 10$ and $\sum D^2 = 280$, what is the coefficient of Rank Correlation?

g) Calculate the regression equation Y on X from the following data :

$\sum X = 30$, $\sum Y = 23$, $\sum XY = 168$, $\sum X^2 = 224$, $\sum Y^2 = 175$, $N = 7$.

h) Fit a linear curve to the data $\sum X = 15$, $\sum Y = 204$, $\sum XY = 748$, $\sum X^2 = 55$, $N = 5$.

i) Is the following function a probability density function?

$$f(x) \quad \begin{array}{ll} 0 & , x \quad 2 \\ \frac{1}{8}(3 \quad 2x) & , 2 \quad x \quad 4 \\ 0 & , x \quad 4 \end{array}$$

j) A sample of 400 male students is found to have a mean height of 67.47 inches. Can it be reasonably regarded as sample from a large population with mean height 67.39 inches and S.D. 1.30 inches.

SECTION-B

2. a) Calculate mean, variance and third central moment from the following data :

x :	0	1	2	3	4	5	6	7	8
***y* :**	1	9	26	59	72	52	29	7	1

b) A coin is tossed until a head appears. What is the expectation of the number of tosses required?

3. a) Find the coefficient of skewness from the data given below:

Size :	3	4	5	6	7	8	9	10
Frequency :	7	10	14	35	102	136	43	8

b) Three bad eggs got mixed up with 7 good eggs. If three eggs are drawn (without replacement) from 10 eggs, find the mean and variance for the number of bad eggs among them.

4. a) *n* person are seated on *n* chairs at a round table. Find the probability that three are sitting next to each other.

b) Find the binomial distribution whose mean is 3 and variance 2.

5. a) If a random variable *x* has a Poisson distribution such that

P ($x = 2$) = 9 P($x = 4$) + 90 P($x = 6$). Then find mean and standard deviation,

b) Calculate correlation coefficient from the following data :

$n = 10$, $\sum X = 140$, $\sum V = 150$, $\sum (X - 10)^2 = 180$, $\sum (Y - 15)^2 = 215$, $\sum (X - 10)(Y - 15) = 60$.

SECTION-C

6. In the accounting department of bank, 100 accounts are selected at random and estimated for errors. The following results were obtained :

No. of errors :	0	1	2	3	4	5	6
No. of accounts :	35	40	19	2	0	2	2

Does this information verify that the errors are distributed according to the Poisson probability law?

7. Fit the curve $y = a + bx^2$ to the data :

x **:**	10	20	30	40	50
y **:**	8	10	15	21	30

8. Given below are the figures of production (in thousand tonnes) of coal :

Year :	1980	1981	1982	1983	1984	1985	1986
Production : (in thousand tones)	70	85	94	83	90	100	98

Fit a straight line by the method of least squares.

9. Can vaccination be regarded as preventive measure of small pox as evidenced by the following data of 1482 persons exposed to small pox in a locality. 368 in all were attacked of these 1482 persons and 343 were vaccinated and of these only 35 were attacked.

NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.