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Total No. of Pages : 03

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**B.Tech.(AI&ML / AI&DS / Block Chain / CSE / CS / CSD / DS / IT /
Robotics & Artificial Intelligence / Internet of Things and Cyber Security
including Block Chain Technology) (Sem.-6)**

MATHEMATICS-III

Subject Code : BTAM-302-23

M.Code : 94630

Date of Examination : 07-01-2025

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** contains **FIVE** questions carrying **FIVE** marks each and students have to attempt any **FOUR** questions.
3. **SECTION-C** contains **THREE** questions carrying **TEN** marks each and students have to attempt any **TWO** questions.

SECTION-A

1. Write briefly :

- a) What do you mean by Skewness?
- b) Give an example of a random experiment.
- c) A die is thrown at random. Find the probability that the number on it is greater than 4.
- d) Define Poisson distribution.
- e) Write down the mean and variance of binomial distribution.
- f) Write down the steps of method of least square to fit a straight line of the form $y = a + bx$, where a and b are constants.
- g) What do you mean by correlation?
- h) Define Standard Error of a sampling distribution of a statistic.
- i) What do you mean by a small sample and a large sample. Give example of each.
- j) When do we use Chi-square test?

SECTION-B

2. Calculate the first four moments of the following distribution about the mean :

<i>x</i>:	0	1	2	3	4	5	6	7	8
<i>f</i>:	1	8	28	56	70	56	28	8	1

3. a) A card is drawn from a well-shuffled pack of playing cards. What is the probability that it is either a spade or an ace?
- b) Prove that the probability of the impossible event is zero.
4. In a normal distribution, 31% of the items are under 45 and 8% of items are over 64. Find the mean and standard deviation of the distribution.
5. By using the method of least squares, find the straight line of the form $y = a + bx$ that fits the following data :

<i>x</i>	100	120	140	160	180	200
<i>y</i>	0.45	0.55	0.60	0.70	0.80	0.85

6. A random sample of size 16 has 53 as mean. The sum of squares of the deviation from mean is 135. Can this sample be regarded as taken from the population having 56 as mean?

SECTION-C

7. Define binomial distribution. Fit a binomial distribution to the following data:

<i>x</i>:	0	1	2	3	4
<i>y</i>:	28	62	46	10	4

8. A sample of 12 fathers and their eldest sons gave the following data about their heights in inches :

Father	65	63	67	64	68	62	70	66	68	67	69	71
Son	68	66	68	65	69	66	68	65	71	67	68	70

Calculate the coefficient of rank correlation.

9. What is Chi-square test? A die is thrown 90 times with the following results :

Face	1	2	3	4	5	6	Total
Frequency	10	12	16	14	18	20	90

Use Chi-square test to test whether these data are consistent with the hypothesis that the die is unbiased. Given that $\chi^2_{0.05} = 11.07$ for 5 degrees of freedom.

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