

Roll No.

Total No. of Pages : 03

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**B.Tech. (AI&DS/AI&ML/(AI)Block chain/CSE/DS/Cyber Security
CD&DS/EEE/EE/IT/R&AI/Internet of things and cyber security including
Block chain Technology)(Sem.3)**

MATHEMATICS-III
(PROBABILITY AND STATISTICS)

Subject Code :BTAM-302-23

M.Code : 94630

Date of Examination : 09-12-2025

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 :

- State Multiplication theorem of probability.
- Find the mean of first teneven positive numbers.
- Give Merits of Quartile deviation.
- Find the binomial distribution mean is 6 and variance 4.
- Explain the property of Poisson distribution.
- State properties of Rank Correlation Coefficient.
- State Utility of Standard Error.
- Explain Critical region.
- Define Regression Coefficients.
- Write the normal equation for the curve fitting $y = a + bx$ by the method of least squares.

SECTION - B

2. Obtain the Karl Pearson's measure of skewness for the following data :

Values	5-10	10-15	15-20	20-25	25-30	30-35	35-40
Frequency	6	8	17	21	15	11	2

3. Suppose the p.d.f of a random variable X is as follows :

$$f(x) = \begin{cases} cx & \text{for } 0 < x < 4 \\ 0 & \text{elsewhere} \end{cases}$$

where c is a given constant. Determine the value of c and the values of P ($1 \leq X \leq 2$) and P($x > 2$).

4. Fit a curve of the form $y = bx^a$ to the following data :

Year(x)	1	2	3	4	5
Production in tons(y)	7.1	27.8	62.1	110	161

5. In a random sample of 525 families owing television set in the region of New Delhi, it is found that 370 subscribe to star plus. Find a 95 % confidence interval for the actual proportion of such families in New Delhi which subscribe to star plus.
6. In a book of 520 pages, 390 typographical error occur. Assuming Poisson law for the number of errors per page, find the probability that a random sample of 5 pages will contain no error.

SECTION - C

7. In an examination taken by 500 candidates, the mean and the S.D of marks obtained 40% and 10%. Assuming the Normal distribution, find.
- a) How many will pass if 50% is fixed as minimum?
- b) What should be the minimum marks required, if 350 candidates are to pass.
- c) How many students have scored marks above 60%?
8. Calculate rank correlation coefficient for the following data :

X	12	15	18	20	16	15	18	22	15	21	18	15
Y	10	18	19	12	15	19	17	19	16	14	13	17

9. To test the claim that the resistance of electric wire can be reduced by atleast 0.05 ohm by allowing 25 values obtained for each alloyed wire and standard wire produced the following results:

	Mean	Standard Deviation
Alloyed wire	0.083 ohm	0.003 ohm
Standard wire	0.136 ohm	0.002 ohm

Test at 5 % level whether or not the claim is substantiated.

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.