

Roll No.

Total No. of Pages : 02

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B.Tech. (AIML/DS/CSE/IT/Robotics & Artificial Intelligence/Internet of Things and Cyber Security including Block Chain Technology (Sem.-2)

MATHEMATICS – II

Subject Code : BTAM-204-18

M.Code : 91960

Date of Examination : 18-12-2023

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) Find the mean of the square of first 10 natural numbers.
- b) Define Karl Pearson's β and γ coefficients.
- c) An urn contains 7 red and 4 blue balls. Two balls are drawn at random with replacement. Find the probability of getting 2 red balls.
- d) Prove that for Binomial distribution, variance is always less than mean.
- e) State any two properties of Poisson distribution.
- f) If the regression coefficient of X on Y is $\frac{1}{6}$ and that of Y on X is $-\frac{1}{2}$. What is the value of correlation coefficient between X and Y.
- g) Explain the following, with example: Simple and Composite hypothesis.
- h) 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?
- i) Define Chi-square (χ^2) test.
- j) State any two applications of t -test.

SECTION-B

2. Find the missing information (x, y and z) from the following data:

	Group I	Group II	Group III	Combined
Number	50	x	90	200
Standard Deviation	6	7	z	$\sqrt{60}$
Mean	113	y	115	116

3. Calculate Karl Pearson's coefficient of skewness from the following data:

Marks above	0	10	20	30	40	50	60	70	80
No. of students	150	140	100	80	80	70	30	14	0

4. Calculate the Rank - coefficient of correlation from the following data :

X-Series	112	106	109	84	95	95	117	97	95	115
Y-Series	70	68	80	65	71	60	77	68	63	75

5. Determine the regression equation of Y on X by the method of least squares from the data given as :

X	5	8	7	6	4
Y	3	4	5	2	1

SECTION-C

6. In an examination taken by 500 candidates, the mean and S.D. of marks obtained are 40% and 10%. Assuming Normal distribution find :

- a) How many will pass, if 50% is fixed as minimum?
- b) How many students have scored marks above 60%?

7. Fit a second-degree parabola to the following data

x	1.0	1.5	2.0	2.5	3.0	3.5	4.0
y	1.1	1.3	1.6	2.0	2.7	3.4	4.1

8. The guaranteed average life of a certain type of bulbs is 1000 hours with a S.D of hours. It is decided to sample the output so as to ensure that 90% of the bulbs do not fall short of the guaranteed average by more than 2.5%. What must be the minimum size of the sample?
9. Compute the value of students t for the value in a sample of size eight consisting of $-4, -2, -2, 0, 2, 2, 3$ and 3 taking the population mean at zero.

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.