Roll No…….. **Total No. of Printed Pages: [01]**

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B. Tech. (EE) (Semester – 4th)

MATHEMATICS-III (PROBABILITY & STATISTICS)

Subject Code: BMATH3-301

Paper ID: [18111519]

Time: 03 Hours **Maximum Marks: 60**

Instruction for candidates:

1. Section A is compulsory. It consists of 10 parts of two marks each.
2. Section B consist of 5 questions of 5 marks each. The student has to attempt any 4 questions out of it.
3. Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

Section – A **(2 marks each)**

Q1. Attempt the following:

a) Give the Classical and Statistical definitions of probability.

b) What is the chance that a leap year selected at random will contain 53 Sundays?.

c) Define the moments of a random variable.

d) If $A \cap B = \phi$, then show that $P(A) \le P(\overline{B})$.

e) Define the probability mass function.

f) Define the rank correlation.

g) Define Bivariate distribution function.

h) Define the Poisson distribution.

i) What is the test for a single mean?.

j) Find the mean of the following data 2, 6, 3, 2, 5, 8, 9.

Section – B **(5 marks each)**

Q2. A bag contains 7 white, 6 red and 5 black balls, two balls are drawn at random. Find the probability that they will both be white.

Q3. Ten coins are thrown simultaneously. Find the probability of getting at least seven heads.

Q4. For any three events A, B and C, then prove that

$$P(A \cap \overline{B}/C) + P(A \cap B/C) = P(A/C)$$

.

Q5. X is a normally distributed and the mean of X is 12 and Standard Deviation (S.D.) is 4.

Find the probability of $X \ge 20$.

Q6. Prove that for two independent variates *x and y,* the correlation coefficient is zero.

Section – C **(10 marks each)**

Q7. Fit a parabola of second degree to the following data.

x	0	1	2	3	4
y	1	1.8	1.3	2.5	6.3

Q8. Calculate the correlation coefficient of the given.

x	12	15	18	21	27
y	2	4	6	8	12

Q9. Six coins are tossed 6,400 times. Using the Poisson distribution, find the approximate

probability of getting six heads r times.