Code No: 54001 **R09**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year II Semester Examinations, June - 2022
PROBABILITY AND STATISTICS
(Common to CE, IT)

Time: 3 Hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks
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1.a) Define Random Variable, Discrete Random variable, Probabilities mass junction.
b) Suppose three companies X, Y, Z produce T.V.'s. X produces twice as many as Y while Y and Z produce the same number. It is known that 2% of X, 2% of Y and 4% of Z are defective. All the T.V.'s produced are put into one shop and then one T.V. is chosen at random. Suppose a T.V. chosen is defective, what is the probability that this T.V. is produced by company X? [6+9]

2.a) Prove that Poisson distribution is the limiting case of Binomial distribution.
b) Construct sampling distribution of means for the population 3, 7, 11, 15 by drawing samples of six two with replacement. Determine i) Population mean ii) Population standard deviation iii) Sampling distribution of means. [7+8]

3.a) Discuss types of error in statistical hypothesis.
b) A normal population has a mean 0.1 and a standard deviation of 2.1. Find the probability that the mean of simple sample of 900 members will be negative. [7+8]

4.a) The manufacturer of a patent medicine claimed that it was 90% effective in relieving an allergy for a period of 8 hours. In a sample of 200 people who had the allergy, the medicine provided relief for 160 people. Determine whether the manufacturers claim is legitimate at 0.01 level of significance.
b) To estimate the percentage of all lorry drivers exceeding 60 kmph speed on NH5, determine the size of the smallest sample required to be at-least 99% confidence that the error of estimate (sample percentage) is at-most 3.5%. [7+8]

5.a) Test whether there is significant difference at 0.05 level in the quality of teaching among four engineering colleges A, B, C, D of a technological university if the number of failures are 26, 23, 15, 32 respectively. Assume that each college has strength of 200 students.
b) Define confidence interval for mean of t-distribution. [10+5]

6. Find the coefficient of correlation and the lines of regressions for the following marks obtained by 12 students in Mathematics and Statistics. [15]

Mathematics	78	56	36	66	25	75	82	62
Statistics	84	44	57	58	60	68	62	58

7.a) Define the terms expected queue length and ideal period.

b) In a colour T.V. manufacturing plant, a loading unit takes exactly 10 minutes to load 2 T.V. sets into a wagon and again comes back to the position to another set of T.V. If the arrival rate is 2 T.V. sets per 20 minutes. Calculate the average time of T.V. sets in a stationary state. [7+8]

8. A gambler has Re.1. He bets Rs.0.5 at a time and wins Rs.0.5 with probability ½. He stops playing if he loses Re.1 or wins Rs.2.

a) What is the transition probability matrix of the related Markov chain?

b) What is the probability that he has lost his money at the end of 5 plays?

c) What is the probability that the game lasts more than 7 plays? [15]

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