

Code No: 811AD

R13

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MCA I Semester Examinations, January - 2018
PROBABILITY AND STATISTICS

Time: 3hrs

Max.Marks:60

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 20 marks. Answer all questions in Part A.
 Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 8 marks and may have a, b, c as sub questions.

PART - A

5 × 4 Marks = 20

- 1.a) If A and B are events such that $P(A) = \frac{1}{3}$, $P(B) = \frac{1}{4}$ and $P(A \cup B) = \frac{1}{2}$, find $P(B/A)$. [4]
- b) Let X denote the sum of two numbers that appear when a pair of fair dice is tossed. Determine the distribution function. [4]
- c) A comparison of coffee prices at 4 randomly selected grocery stores in a city showed increases from the previous month of 12, 15, 17 and 20 rupees per 1 kg. Find the variance of this sample of price increases. [4]
- d) Write about null hypothesis and alternative hypothesis. [4]
- e) Explain the method of least squares. [4]

PART - B

5 × 8 Marks = 40

- 2.a) Two coins are tossed once. Find the probability of getting i) one head and ii) at least one head.
- b) A card is drawn from a well shuffled pack of cards. Find the probability that it is either a spade or an ace. [4+4]

OR

- 3.a) State and prove Baye's theorem.
- b) A bag A contains 2 white and 3 red balls and another bag B contains 4 white and 5 red balls. One ball is drawn at random from one of the bags and it is found to be red. Find the probability that the red ball drawn is from bag B . [4+4]

4. A random variable X has the following probability distribution.

X:	0	1	2	3	4	5	6	7	8
P(X):	k	3k	5k	7k	9k	11k	13k	15k	17k

 Find a) $P(X < 3)$ b) $P(X \geq 3)$ and c) $P(2 \leq X < 5)$. [8]

OR

- 5.a) Prove that the Poisson distribution is a limiting case of Binomial distribution.
- b) If X is normally distributed with mean 30 and standard deviation 5, find $P(|x - 30| > 5)$. [4+4]



6. Samples of size 2 are taken from the population 1, 2, 3, 4, 5, 6 with replacement. Find a) the mean of the sampling distribution of means and b) the standard deviation of the sampling distribution of means. [4+4]

OR

- 7.a) A random sample of size 81 is taken from an infinite population having the mean 65 and standard deviation 10. Find the probability that \bar{x} will be between 66 and 68. [4+4]
b) Explain briefly Point estimation.

- 8.a) A sample of 64 students have a mean weight of 70 kgs. Can this be regarded as a sample from a population with mean weight 56 kgs and standard deviation 25 kgs?
b) Among the items produced by a factory, 15 were defective out of 500. In another sample, 20 were defective out of 400. Test the significance between the differences of two proportions at 5% level. [4+4]

OR

9. Two random samples of sizes 9 and 6 gave the following values of the variable.

Sample 1 15 22 28 26 18 17 29 21 24

Sample 2 8 12 9 16 15 10 - - -

Test the difference of the estimates of the population variances at 5% level of significance. [8]

- 10.a) Fit a second degree curve $y = a + bx + cx^2$ for the following data.

x:	-3	-1	1	3
y:	15	5	1	5

- b) From a sample of 200 pairs of observations, the following quantities were calculated.

$$\sum x = 11.34, \sum y = 20.78, \sum x^2 = 12.16, \sum y^2 = 84.96 \text{ and } \sum xy = 22.13.$$

Compute the coefficients of the equation $y = a + bx$.

[4+4]

OR

11. Obtain the two regression lines equations and calculate the correlation coefficient for the following data: [8]

x:	1	2	3	4	5	6	7	8	9
y:	9	8	10	12	11	13	14	16	15

---ooOoo---