Code No: 821AD **R15**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MCA I Semester Examinations, June/July - 2018
PROBABILITY AND STATISTICS

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

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A

5 × 5 Marks = 25

1.a) State and prove Multiplication theorem of probability. [5]
b) Define the probability distribution function and write its properties. [5]
c) A population has mean 100 and standard deviation 16. What are the mean and standard deviation of the sample mean for random sample of size 4 drawn with replacement.[5]
d) Explain the type I and type II error. [5]
e) Write the properties of Karl pearson coefficient of correlation. [5]

PART - B

5 × 10 Marks = 50

2. In a factory, machine A produces 40% of the output and machine B produces 60%. On average, 9 items in 1000 produced by A are defective and 1 Item in 250 produced by B defective. An item drawn at random from a day's output is defective. What is the probability that it was produced by A or B. [10]

OR

3.a) A card is drawn from a well shuffled pack of cards. What is the probability that it is either a spade or an ace.
b) Box A contains 5 red and 3 white marbles and box B contains 2 red and 6 white marbles. if a marble is drawn from each box, what is the probability that they are both of same color. [5+5]

4. The probability density function $f(x)$ of continuous random variable is given by $f(x) = ce^{-|x|}$, $-\infty < x < \infty$. Shows that $c = \frac{1}{2}$ and find that the mean and variance of the distribution. Also find the probability that the variate lies between 1 and 4. [10]

OR

5.a) Prove that, the mean of the binomial distribution is np where n is number of trails of an experiment and p is the probability of success of an event.
b) Using Poisson distribution, Find the probability that the ace of spades will be drawn from a pack of well shuffled cards at least once in 104 consecutive trials. [5+5]

6.a) The mean and standard deviation of a population of a sample are 11795 and 14054 respectively. If n=50, find the 95% confidence interval.

b) A random variable of size 100 has standard deviation of 5. What can you say about maximum error with 95% confedence

c) What is the size of the smallest sample required to estimate an unknown proportion to within a maximum error of 0.06 with at least 95% confidence. [10]

OR

7.a) In a sample of 1000 cases, the mean of a certain test is 14 and standard deviation is 2.5. Assuming the distribution to be normal, find

i) How many students score to be between 12 and 15?

ii) How many students score above 18?

iii) How many students score below 18?

b) Let $S = \{1,5,6,8\}$, find the probability distribution of the sample mean for random sample of size 2 drawn without replacement. [5+5]

8. A pair of dice are thrown 360 times and the frequency of each sum is indicated below

Sum	2	3	4	5	6	7	8	9	10	11	12
Frequency	8	24	35	37	44	65	51	42	26	14	14

Would you say that the dice are fair on the basis of the chi-square test at 0.05 level of significance? [10]

OR

9.a) 20 people were attacked by a disease and only 18 survived. Will you reject the hypothesis that the survival rate if attacked by this disease is 85% in favour of the hypothesis that is more than at 5% level.

b) 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 25kgs. [5+5]

10. Derive the normal equations for fitting of the straight line $y = a + bx$ [10]

OR

11. Fit the parabola $y = a + bx + cx^2$ from the following data [10]

X	5	7	8	10	11	13	16
Y	33	30	28	20	18	16	9

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