Code No: 841AD **R17**

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) A bag contains 26 red balls and 24 green balls. If one ball is randomly selected from this bag, find the probability that this ball is i) red and ii) green. [5]

b) Define discrete and continuous random variables with an example of each. [5]

c) If a random sample of size 81 is taken whose variance is 20.25 and mean is 32, construct 98% confidence interval. [5]

d) Explain errors in sampling. [5]

e) Derive normal equations to fit a straight line of the form $y = ax + b$ for a given set of N data points (x_i, y_i), $i = 1, 2, \ldots\ldots N$. [5]

PART - B

5 × 10 Marks = 50

2.a) State and prove addition theorem of probability.

b) Let A and B be two events with $P(A \cup B) = \frac{7}{8}$, $P(A \cap B) = \frac{1}{4}$ and $P(\bar{A}) = \frac{5}{8}$. Find i) $P(A)$ ii) $P(B)$ iii) $P(\bar{A} \cup \bar{B})$. [5+5]

OR

3.a) State and prove Baye's theorem.

b) A business man goes to hotels A, B, C, 20%, 50%, 30% of the times respectively. It is known that 5%, 4%, 8% of the rooms in A, B, C hotels have faulty plumbings. What is the probability that the business man's room having faulty plumbing is assigned to hotel C? [5+5]

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

X :	0	1	2	3	4
P(X):	C	2C	2C	C^2	$5C^2$

Find i) C and ii) the distribution function of X.

b) A continuous random variable X has pdf $f(x) = \frac{3}{4}\left(x^2 + 1\right)$, $0 \le x \le 1$. Find i) 'a' such that $P(X \le a) = P(X > a)$ and ii) mean of X. [5+5]

OR

5. Find the mean and variance of Normal distribution. [10]

6. Let $S = \{1, 5, 6, 8\}$. Find the probability distribution of the sample mean for random sample of size 2 without replacement. [10]

OR

7. In how many ways estimation can be done and what are they? Explain in detail. [10]

8. In two large populations, there are 30% and 25% respectively of fair haired people. Is this difference likely to be hidden in samples of 1200 and 900 respectively from the two populations? [10]

OR

9. Two independent samples of sizes 8 and 7 had the following values.

Sample A 11 11 13 11 15 9 12 14

Sample B 9 11 10 13 9 8 10 –

Is the difference between the means of samples significant? [10]

10. Construct the least squares linear and quadratic approximations to the following data: [10]

x :	1	2	3	4	5
y :	2.5	4.5	3.7	5.0	4.2

OR

11. Show that $r = \dfrac{\sigma_x^2 + \sigma_y^2 - \sigma_{x-y}^2}{2\sigma_x\sigma_y}$, where $\sigma_x^2, \sigma_y^2, \sigma_{x-y}^2$ are variances of $x, y, x-y$ respectively. Hence find the correlation coefficient r for the following data: [10]

x :	6	5	8	8	7	6	10	4	9	7
y :	8	7	7	10	5	8	10	6	8	6

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