

Code: 13A54303

B.Tech II Year I Semester (R13) Supplementary Examinations June 2015

PROBABILITY & STATISTICS

(Common to IT & CSE)

Time: 3 hours

Max. Marks: 70

PART - A

(Compulsory Question)

- 1 Answer the following: (10 X 02 = 20 Marks)
- Find the probability that a non-leap year will have 53 Tuesdays.
 - Define normal distribution.
 - In a random sample of 400 industrial accidents, it was found that 231 were due to unsafe working conditions. Construct a 99% confidence interval for the corresponding true proportion.
 - Define: critical region.
 - Write the basic principle of ANOVA.
 - Explain coding method briefly.
 - What are control limits for standard deviation?
 - Explain control chart for standard deviation.
 - Define steady state and transient state.
 - Describe the basic elements of a queuing system.

PART - B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT - I

- 2 The cumulative distribution function for a continuous random variable X is:

$$F(x) = \begin{cases} 1 - e^{-2x}, & x \geq 0 \\ 0, & x < 0 \end{cases}$$

Find: (i) The density function $f(x)$. (ii) Mean. (iii) Variance of the density function.**(OR)**

- 3 Derive Mode and mean deviation from mean for Normal distribution.

UNIT - II

- 4 In a random sample of 1000 persons from town A, 400 are found to be consumers of wheat. In a simple of 800 from town B, 400 are found to be consumers of wheat. Do these data reveal a significant difference between town A and town B, so far as the proportion of wheat consumers is concerned?

(OR)

- 5 The IQs of 16 students from one area of a city showed a mean of 107 with a standard deviation of 10, while the IQs of 14 students from another area of the city showed a mean of 112 with a standard deviation of 8. Is there a significant difference between the IQs of the two groups at a 0.05 level of significance?

UNIT - III

- 6 Explain two-way ANOVA technique with table.

(OR)

- 7 Set up analysis of variation table for the following two-way design results

Per Acre Production Data of Wheat			
	Varieties of seeds In metric tones		
	A	B	C
Varieties of Fertilizers			
W	6	5	5
X	7	5	4
Y	3	3	3
Z	8	7	4

Contd. in page 2

UNIT - IV

- 8 During an inspection, 20 of successively selected samples of polished metal sheet, the number of defects observed per sheet is recorded, as shown in the following table, Construct a C-chart for the number of defects.

Sample number	No. of defects	Sample number	No. of defect
1	3	11	5
2	0	12	2
3	5	13	1
4	1	14	1
5	2	15	2
6	3	16	3
7	2	17	4
8	4	18	0
9	0	19	1
10	2	20	2

(OR)

- 9 Explain R-chart for ranges and S-chart for standard deviation.

UNIT - V

- 10 Discuss (M/M/1):(N/FCFS) Queuing model and find the average number of customers in the system.

(OR)

- 11 At a railway station, only one train is handled at a time. The railway yard is sufficient only for two trains to wait while other is given signal to leave the station. Trains arrive at the station at an average rate of 6 per hour and the railway station can handle them on an average of 12 per hour. Assuming Poisson arrivals and exponential service distribution, find the steady state probabilities for the various number of trains in the system. Find also the average waiting time of a new train coming into the yard.
