

B.Tech II Year II Semester (R15) Regular Examinations May/June 2017

**PROBABILITY & STATISTICS**

(Common to CE, CSE, IT and ME)

Time: 3 hours

Max. Marks: 70

**PART – A**

(Compulsory Question)

(Use of statistical tables is permitted in the examination hall)

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- 1 Answer the following: (10 X 02 = 20 Marks)
- Define: (i) Independent event. (ii) Conditional probability.
  - For the continuous probability function  $f(x) = Kx^2e^{-x}$  when  $x > 0$ , find  $K$ .
  - Among 900 people in a state 90 are found to be chapatti eaters. Construct 99% confidence interval for the true population.
  - The test statistic to test the significance of difference between two sample proportions, in case of large samples is -----
  - Find  $\rho(t < 2.365)$  when  $v = 7$ .
  - Define contingency table.
  - Define chance cause, assignable cause.
  - What are control limits for C-chart?
  - What is the probability that there are  $n$  or more customers in the system?
  - Give general structure of a queueing system.

**PART – B**

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

**UNIT – I**

- 2 Find the mean and variance of the uniform probability distribution given by  $f(x) = \frac{1}{n}$  for  $x = 1, 2, 3, \dots, n$ .

**OR**

- 3 The marks obtained in statistics in a certain examination found to be normally distributed. If 15% of the students  $\geq 60$  marks, 40%  $\leq 30$  marks, find the mean and standard deviation.

**UNIT – II**

- 4 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 at 5% level.

**OR**

- 5 A random sample of 300 shoppers at a super market includes 204, who regularly use cents off coupons. In another sample of 500 shoppers at a super market includes 75, who regularly use cents off coupons. Test the significance difference of two proportions at 2% level. Construct confidence interval for the probability that any one shopper in sample selected at random will use regularly cents off coupons.

**UNIT – III**

- 6 Memory capacity of 10 students were tested before and after training. State whether the training was effective or not from the following scores.

Before training	12	14	11	8	7	10	3	0	5	6
After training	15	16	10	7	5	12	10	2	3	8

**OR**

- 7 The measurements of the output of two units have given the following results. Assuming that both samples have been obtained from the normal populations at 10% significant level, test whether the two populations have the same variance.

Unit – A	14.1	10.1	14.7	13.7	14.0
Unit – B	14.0	14.5	13.7	12.7	14.1

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**UNIT – IV**

- 8 The following are the sample means and ranges for ten samples each of size 5. Construct the control chart for mean and range and comment on the nature of control.

Sample No	1	2	3	4	5	6	7	8	9	10
Mean	12.8	13.1	13.5	12.9	13.2	14.1	12.1	15.5	13.9	14.2
Range	2.1	3.1	3.9	2.1	1.9	3.0	2.5	2.8	2.0	2.5

**OR**

- 9 The number of defects on 20 items are given below.

Item no	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Number of defects	2	0	4	1	0	8	0	1	2	0	6	0	2	1	0	3	2	1	0	2

Devise a suitable control scheme and draw control charts for the future.

**UNIT – V**

- 10 Derive variance of  $n$ , where 'n' is the number of customers in the system.

**OR**

- 11 Cars arrive at a petrol pump with exponential interval times having mean  $\frac{1}{2}$  minute. The attendant takes an average of  $\frac{1}{5}$  minutes per car to supply petrol. Service rate being exponentially distributed. Find:  
(i) The average number of cars waiting to be served. (ii) The average number of cars in the system.

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