

Code: 13A54303

B.Tech II Year II Semester (R13) Regular &amp; Supplementary Examinations May/June 2016

**PROBABILITY & STATISTICS**

(Common to CE and ME)

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

Time: 3 hours

Max. Marks: 70

**PART – A**

(Compulsory Question)

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- 1 Answer the following: (10 X 02 = 20 Marks)
- Family has 3 children. Probability of type A is  $\frac{1}{2}$  for each child. What are the probabilities of 0, 1, 2 or 3 with type A?
  - Out of 800 families with 5 children each, how many would you expect to have, 3 boys?
  - What are the statistical hypothesis and types?
  - Explain the level of significance.
  - What is the general purpose of the ANOVA one way classification?
  - What is the general purpose of the ANOVA two way classification?
  - Explain statistical quality control.
  - What is the product quality control?
  - What are the applications of the queuing theory?
  - What is the model in which only arrivals are considered no departure taken place?

**PART – B**

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

**UNIT – I**

- 2 Of all the smokers in a particular district, 40% prefer brand A and 60% prefer brand B. Of those smokers who prefer brand A, 30% are females and of those who prefer brand B, 40% are female. What is the probability that a randomly selected smoker prefers brand A, given that the person selected is female.

**OR**

- 3 In a distribution of normal, 7% of items are under 35 and 89% are under 63. What are the mean and standard deviation of the distribution?

**UNIT – II**

- 4 According to the norms established for a civil aptitude test, persons who are 18 years old have an average height of 73.2 with S.D of 8.6. If 4 persons are selected at randomly that age averaged 76.2, test the hypothesis  $\mu = 73.2$  against the alternative hypothesis  $\mu > 73.2$  at the 0.01 level of significance.

**OR**

- 5 200 digits were chosen at random from a set of table. The frequencies of the digits were:

Digit	0	1	2	3	4	5	6	7	8	9
Frequency	18	19	23	21	16	25	22	20	21	15

Use the chi-square test to assess the correctness of the hypothesis that the digits were distributed in the equal number in the tables from which these were chosen.

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**UNIT – III**

- 6 Susan predicts that students will earn most effectively with a constant background sound, as opposed to an unpredictable sound or no sound at all. She randomly divides twenty-four students into three groups of eight. All students study a passage of text for 30 minutes. Those in group 1, study with background sound at a constant volume in the background. Those in group 2, study with noise that changes volume periodically. Those in group 3, study with no sound at all. After studying, all students take a 10 point multiple choice test over the material. Their scores below:

Group	Test scores							
(i) Constant sound	7	4	6	8	6	6	2	9
(ii) Random sound	5	5	3	4	4	7	2	2
(iii) No sound	2	4	7	1	2	1	5	5

Weather her hypothesis supported? Justify your answer.

**OR**

- 7 As a psychologist who works with people who have Down's syndrome, you design a study intended to determine which rewards are most effective for use in training your patients. You select four different, independent, groups of six patients and record the number of days it takes to each them a particular task, with each group receiving one of four types of rewards: Reward 1, Reward 2, Reward 3 and Reward 4. The number of days are given in the following table.

Reward 1	Reward 2	Reward 3	Reward 4
3	6	9	12
5	7	10	13
6	9	15	15
2	7	12	18
1	11	11	15
2	6	10	13

Use the data above to conduct a one-way analysis of variance.

**UNIT – IV**

- 8 A machine is set to deliver packets of a given weight. Ten samples of size 5 each were recorded. Below are given data.

Sample No:	1	2	3	4	5	6	7	8	9	10
Range	7	7	4	9	8	7	12	4	11	5

Draw the R-chart and comment on its state of control.

**OR**

- 9 Samples of 100 tubes are drawn randomly from the output of a process that produces several thousand units daily. Sample items are inspected for quality and defective tubes are rejected. The results of 10 samples are shown below.

Sample No:	1	2	3	4	5	6	7	8	9	10
No. of defective items	8	10	13	9	8	10	14	6	10	13

On the basis of information given above prepare a control chart for fraction defective. What conclusion do you draw from the control chart?

**UNIT – V**

- 10 Explain Pure Dearth and Birth process.
- OR**
- 11 Explain the analysis of M / M / 1 queueing system.

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