

B.Tech II Year II Semester (R13) Supplementary Examinations December 2016

PROBABILITY & STATISTICS

(Common to CE & ME)

Time: 3 hours

Max. Marks: 70

PART – A

(Compulsory Question)

- 1 Answer the following: (10 X 02 = 20 Marks)
- State Multiplication theorem for three events (Dependent events).
 - Derive the Mean for Poisson distribution.
 - Define Interval Estimator, degrees of freedom (d.f).
 - State Type I and Type II Errors.
 - Define ANOVA.
 - Write the Error Sum Of Squares of LSD.
 - State the Total Sum of Squares of Two Way classification.
 - State the Control Limits for C-Chart.
 - Explain the term assignable causes.
 - State the different Queue disciplines.

PART – B

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

UNIT – I

- 2 A bolt manufacturing company has three machines A, B and C with equal capacity. A bolt is drawn at random it is found to be defective; the chance of getting a defective bolt from each machine is 1%, 2% and 1% respectively. Find the probability that the defective bolt is drawn from machine B.

OR

- 3 Derive mean and variance of Normal distribution.

UNIT – II

- 4 A random sample of 10 boys had the following IQs, 70, 120, 110, 101, 88, 83, 95, 98, 107, 100 and whose Population mean IQ is 100. Test whether all samples are drawn from in the same population mean IQ.

OR

- 5 A mean breaking strength of the cables supplied by a manufacturer is 1800 with a S.D of 100. A random sample of 50 cables were tested and found that the mean breaking strength is 1850. Can we support the claim at 1% LOS?

UNIT – III

- 6 The following data gives the number of aircraft accidents that occurred during the various days of a week.

Days	Mon	Tue	Wed	Thurs	Fri	Sat
No. of accidents	15	19	13	12	16	15

Test whether the accidents are uniformly distributed over the week.

OR

- 7 A random sample from each of three makes of ropes and their breaking strength are measured with the following results: (i) 70, 72, 75, 80, 83
(ii) 60, 65, 57, 84, 87, 83
(iii) 100, 110, 108, 112, 113, 120, 107

Test whether the breaking strength of ropes differ significantly?

UNIT – IV

8 Find the probability density function of the waiting time (W_Q) in the queue of the model $[M/M/1] : (\infty/\text{FIFO})$.

OR

9 Customers arrive at a one man barber shop according to a Poisson process with a mean interval arrival time of 12 minutes. Customers spend on an average 10 minutes in the barber's chair.
 (i) What is the expected number of customers in the barber shop and in the queue?
 (ii) Calculate the percentage of time on arrival can walk straight into the barber's chair without having to wait.

UNIT – V

10 Construct mean chart (\bar{X} Bar) and Range Chart for the following data with each of 5 samples.

Sample No.	1	2	3	4	5	6	7	8	9
Mean	64	65	87	42	89	68	74	71	73
RANGE	6	5	9	4	5	3	4	4	7

Comment on the Control Limits.

OR

11 Construct the Fraction Defective Chart for the following data.

Sample No.	1	2	3	4	5	6	7	8	9
No of Samples	97	85	74	89	61	78	73	82	86
Defectives	3	5	7	5	4	2	3	7	9

Comment on the Control Limits.
