

PROBABILITY & STATISTICS

(Common to IT and CSE)

(Use of statistical tables is permitted)

Time: 3 hours

Max. Marks: 70

PART – A
(Compulsory Question)

- 1 Answer the following: (10 X 02 = 20 Marks)
- From a box containing 10 balls, the number of ways in which 3 balls can be drawn at Random is _____.
 - The probability of a man hitting a target is $\frac{1}{4}$. If he fixes 7 times, the probability of hitting the target at least twice is _____.
 - Finite population correction factor is _____.
 - If sample size $n = 144$, standard deviation $\sigma = 4$ and the mean = 150, then 95% confidence interval for μ is _____.
 - What is the significance of ANOVA?
 - Write a short note on Latin-square design.
 - Define SQC.
 - What are Shewhart control charts?
 - Find the mean (or expected) waiting time in the queue.
 - Explain Kendall's notation for representing queuing model.

PART – B
(Answer all five units, 5 X 10 = 50 Marks)**UNIT - I**

- 2 Derive mean and variance of Poisson distribution.

OR

- 3 An electrical firm manufactures light bulbs that have a life, before burnout, which is normally distributed with mean equal to 800h and a standard deviation of 40h. Find the probability that a bulb burns between 778h and 834h.

UNIT - II

- 4 If 120 out of 100 patients suffering from a certain disease are cured by allopathy and 240 out of 500 patients are cured by homeopathy, is there reason enough to believe that allopathy is better than homeopathy in curing the disease? Use $\alpha = 0.05$ LOS.

OR

- 5 A new process of producing synthetic diamonds can be operated at a profitable level only if the average weight of the diamonds is greater than 0.5 carat. To test the profitability of the process, 6 diamonds are produced with weights 0.45, 0.60, 0.52, 0.49, 0.58 and 0.54 carat respectively. Do the 6 measurements present sufficient evidence to indicate that the average weight of the diamonds produced by the process is in excess of 0.5 carat?

UNIT - III

- 6 Explain the meaning of ANOVA. Describe briefly the technique of ANOVA for one-way of classification.

OR

- 7 Set up an analysis of variance table for the following per acre production data for three varieties of wheat, each grown on 4 plots and state if the variety differences are significant.

Plot of Land	Per Acre Production Data		
	Variety of Wheat		
	A	B	C
1	6	5	5
2	7	5	4
3	3	3	3
4	8	7	4

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UNIT – IV

- 8 What are 3σ control limits? Explain the difference between confidence limits and control limits.
OR
- 9 A textile company wishes to implement a quality control program on a certain garment with respect to the number of defects found in the final production. A garment was sampled on 33 consecutive hours of production. The number of defects found per garment is given hereunder.
Defects: 5, 1, 7, 1, 0, 2, 3, 4, 0, 3, 2, 4, 3, 4, 4, 1, 4, 2, 1, 3, 4, 3, 11, 3, 7, 8, 5, 6, 1, 2, 4, 7, 3.
Compute the upper and lower 3-sigma control limits for monitoring the number of defects.

UNIT – V

- 10 Discuss $(M/M/1):(\infty/FCFS)$ Queueing model and find the expected Queue length in the system.
OR
- 11 A road transport company has bus reservation clerk on duty at a time. He handles information of bus schedules and makes reservations. Customers arrive at a rate of 8 per hour. Answer the following:
- What is the average number of customers waiting for the service of the clerk?
 - What is the average time a customer has to wait before getting the service?
