



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

B.Tech IV Semester End Examinations (Regular), November – 2020

Regulation: IARE–R18

PROBABILITY AND STATISTICS

(CE)

Time: 2 Hours

Max Marks: 70

Answer any Four Questions from Part A

Answer any Five Questions from Part B

PART – A

1. State and prove Baye's theorem. [5M]
2. 6 dice are thrown 729 times. How many times do you expect at least 3 dice to show a five or a six? [5M]
3. Write the properties of regression lines. [5M]
4. A random sample of size 100 is taken from an infinite population having the mean 76 and the variance 256. What is the probability that sample mean lies between 75 and 78. [5M]
5. A sample of 26 bulbs gives a mean life of 990 hrs with S.D of 20hrs. The manufacturer claims that the mean life of bulbs 1000 hrs. Is the sample not upto the standard? Table value $z=1.96$. [5M]
6. If 3% of the electric bulbs manufactured by a company are defective, find the probability that in a sample of 100 bulbs exactly five bulbs are defective. [5M]
7. Write about Binomial and Poisson distribution. [5M]
8. From the following data calculate i) correlation coefficient ii) standard deviation of y . $b_{xy}=0.85$, $b_{yx}=0.89$, $\sigma_x=3$. [5M]

PART – B

9. Let X denotes the minimum of the two numbers that appear when a pair of fair dice is thrown once. Determine i) Discrete probability distribution ii) Expectation iii) Variance. [10M]
10. A factory manufacturing television has four units A,B,C,D. The units A,B,C,D manufactures 15%,20%,30%,35% of the total output respectively. It was found that out of their outputs 1%,2%,2% and 3% are defective. A television is chosen at random from the output and found to be defective. What is the probability that, it came from unit D? [10M]
11. In a normal distribution, 31% of the items are under 45 and 8% are over 64. Find the mean and variance of the distribution. Table values: 0.5 and 1.41. (inverse z values) [10M]
12. A manufacturer of pins knows that 2% of his products are defective. If he sells pins in boxes of 100 and guarantees that not more than 4 pins will be defective, what is the probability a box will have more than 4 pins using poisson distribution? [10M]
13. The two lines of regression are $8x-10y+66=0$, $40x-18y-214=0$ the variance of X is 9. Find i) The mean values of X and Y ii) Correlation coefficients between X and Y . [10M]
14. Find the Pearson's coefficient of correlation for the following data in Table 1 [10M]

Table 1

X	35	40	60	79	83	95
Y	17	28	30	32	38	49

15. The means of two samples of 1000 and 2000 members are respectively 67.5 and 68 inches .Can they be regarded as drawn from the same population with S.D.2.5 inches? Table value: 1.96. **[10M]**
16. In a sample of 600 parts manufactured by a factory ,the number of defective parts was found to be 45.The company however claimed that only 5% of their product is defective .Is the claim tenable? Table value: 1.96. **[10M]**
17. A random sample of 10 boys has the following IQ's:70,120,110,101,88,83,95,98,107,100.Do these data support the assumption of a population mean IQ of 100? t table value: 2.26. **[10M]**
18. Pumpkins were grown under two experimental conditions. Two random samples of 11 and 9 pumpkins. the sample standard deviation of their weights as 0.8 and 0.5 respectively. Assuming that the weight distributions are normal, test hypothesis that the true variances are equal. F table value = 3.05. **[10M]**

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