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SIDDHARTH INSTITUTE OF ENGINEERING &amp; TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech II Year II Semester Supplementary Examinations February-2022

PROBABILITY &amp; STATISTICS

(Common to CE, EEE, ME, CSE, CSIT &amp; AGE)

Time: 3 hours

Max. Marks: 60

(Answer all Five Units 5 x 12 = 60 Marks)

**UNIT-I**

- 1 Probability density function of a random variable X is  $f(x) = \begin{cases} \frac{1}{2} \sin x, & \text{for } 0 \leq x \leq \pi \\ 0, & \text{elsewhere} \end{cases}$  12M

Find the mean, mode and median of the distribution and also find the probability between 0 and  $\pi/2$ .

OR

- 2 The probability density  $f(x)$  of a continuous random variable is given by 12M  
 $f(x) = ce^{-|x|}, -\infty < x < \infty$ . Show that  $c = 1/2$  and find that the mean and variance of the distribution. Also find the probability that the variate lies between 0 and 4.

**UNIT-II**

- 3 a Derive mean and variance of Poisson distribution. 7M  
 b If 2% of light bulbs are defective. Find the probability that (i) At least one is defective (ii)  $p(1 < x < 8)$  in a sample of 100. 5M

OR

- 4 Find the mean and variance of a Normal distribution in which 31% of items are under 45 and 8% are over 63. 12M

**UNIT-III**

- 5 A random sample of 10 boys had the following I.Q's : 70,120,110,101,88,83,95,98,107 and 100 12M  
 i) Do these data support the assumption of a population mean I.Q of 100?  
 ii) Find a reasonable range in which most of the mean I.Q values of samples of 10 boys lie.

OR

- 6 Two random samples reveal the following results: 12M

Sample	Size	Sample Mean	Sum of squares of deviations from the mean
1	10	15	90
2	12	14	108

Test whether the samples came from the same normal population.

**UNIT-IV**

- 7 Describe briefly the technique of ANOVA for Two-way classification. 12M

OR

- 8 An agriculturist wants to test the effects of four different fertilizers A, B, C, D on the yield of paddy. In order to eliminate sources of error due to variabilities in self-fertility, he used the fertilizers in Latin square arrangements given below where the numbers indicate yields in quintals per unit area. Perform an analysis of variance to decide whether there is a difference between the fertilizers at 5% level of significance. 12M

A18	C21	D25	B11
D22	B12	A15	C19
B15	A20	C23	D24
C22	D21	B10	A27

UNIT-V

- 9 The following are the figures of defectives in 22 lots each containing 2000 rubber belts: 12M

425, 430, 216, 341, 225, 322, 280, 306, 337, 305, 356

402, 216, 264, 126, 409, 193, 326, 280, 389, 451, 420

Draw control chart for fraction defective and comment on the state of control of the Process.

OR

- 10 a Write the constructions of mean, range, p and c -charts. 7M  
b Write the causes of variations. 5M

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