R18

Reg. No:

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B. Tech II Year I Semester Regular Examinations Nov/Dec - 2019
PROBABILITY & STATISTICS
(Common to ME, CSE & CSIT)

Time: 3 hours   Max. Marks: 60M

PART-A
(Answer all the Questions **5 x 2 = 10** Marks)

1 **a** If $P(A) = \frac{1}{2}$, $P(B) = \frac{1}{4}$ and $P(A \cap B) = \frac{1}{8}$ then compute the value of $P(A \cup B)$.   **2 M**

   b If X is a Poisson variable, obtain the value of λ from $2\,P(X=1) = P(X=2)$.   **2 M**

   c Obtain mode of the values 10, 12, 15, 20, 12, 16, 18, 15, 12, 10, 16, 20, 12, 24.   **2 M**

   d Write normal equations for $y = ax^2 + bx + c$.   **2 M**

   e For an F-distribution, find tabulated value of $F_{0.05}$ with $v_1 = 24$ and $v_2 = 19$.   **2 M**

PART-B
(Answer all Five Units **5 x 10 = 50** M)
UNIT-I

2 **a** Two cards are selected at random from 10 cards numbered 1 to 10. Find the probability that the sum is even if (i) The two cards are drawn together. (ii) The two cards drawn one after other with replacement.   **5 M**

   b Find the mean and variance of the uniform probability distribution function given by $f(x) = \frac{1}{n}$ for, $x = 1, 2, \dots, n.$.   **5 M**

OR

3 **a** A businessman goes to hotels X, Y, Z, 20%, 50%, 30% of the time respectively. It is known that 5%, 4%, 8% of the rooms in X, Y, Z hotels have faulty plumbing. What is the probability that businessman's room having plumbing is assigned to hotel Z?   **5 M**

   b Determine (i) K (ii) mean (iii) P(0<X<5) (iv) variance from the following table.   **5 M**

X	0	1	2	3	4	5	6	7
P(x)	0	K	2K	2K	3K	K^2	$2K^2$	$7K^2$+K

UNIT-II

4 **a** Calculate the probabilities that among 18 engineering students, assume that 50% of all engineering students are good in Mathematics find the probability that (i) exactly 10 (ii) at least 10 (iii) at least 2 and at most 9 are good in mathematics.   **5 M**

   b If X is a Poisson variate, such that $P(X=0) = P(X=2) + 3\,P(X=4)$. Compute the (i) Mean (ii) variance and (iii) $P(X \le 2)$.   **5 M**

OR

5 **a** Construct a binomial distribution for the following data   **5 M**

X	0	1	2	3	4	5	6
$f(x)$	13	25	52	58	32	16	4

   b The mean height of 500 students is 151 cm, and the standard deviation is 15 cm, assuming that the heights are normally distributed, calculate how many students' heights lie between 120 and 155 cm.   **5 M**

UNIT-III

6 Compute Karl Pearson and Bowley's coefficient of Skewness to the following data **10M**

X	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
F	2	6	11	20	40	75	45	25	18	8

OR

7 a Find mode to the following data. **5 M**

X	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70
F	4	13	21	44	33	22	7

b Find two regression equations from the following data. **5 M**

X	10	25	34	42	37	35	36	45
Y	56	64	63	58	73	75	82	77

UNIT-IV

8 a Applying method of least square principle, construct a curve of the form $y = a\,e^{bx}$ to the following data **5 M**

X	77	100	185	239	285
Y	2.4	3.4	7.0	11.1	19.6

b Examine the significance of the difference of means of two groups. In a test given two groups of students marks obtained are as follows **5 M**

Group I:	18	20	36	50	49	36	34	49	41
Group II:	29	28	26	35	30	44	44	--	--

OR

9 a Fit a second-degree polynomial to the following data by method of least squares **5 M**

x	0	1	2	3	4
y	1	1.8	1.3	2.5	6.3

b At a certain date in a large city 400 out of a random sample of 500 men were found to be smokers. After the heavy taxation on tobacco another sample of 600 men in the same city included 400 smokers. Examine whether decrease in the proportion of smokers significant? **5 M**

UNIT-V

10 To examine the hypothesis that the husbands are more intelligent than the wives, an investigator took a sample of 10 couples and administered them a test which measures the I.Q. The results are as follows: **10M**

Husbands	117	105	97	105	123	109	86	78	103	107
Wives	106	98	87	104	116	95	90	69	108	85

Test the hypothesis with a reasonable test at the level of significant of 0.05 and calculate F- test.

OR

11 a Samples of two types of electrical light bulbs were tested for length of life and following data were obtained **5 M**

	Sample numbers	Sample mean	Sample S. D
Type I	8	1234 hrs.	36 hrs.
Type II	7	1036 hrs.	40 hrs.

Is the difference in the means sufficient to warrant that type I is superior to type II regarding length of life.

b A die is thrown 264 times with the following results. Show that the die is biased. [Given $\chi^2_{0.05} = 11.07$ for 5 degrees of freedom] **5M**

No. appeared on the die	1	2	3	4	5	6
Frequency	40	32	28	58	54	52

END