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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B. Tech II Year I Semester Supplementary Examinations November-2020

PROBABILITY & STATISTICS

(Common to ME, CSE & CSIT)

Time: 3 hours

Max. Marks: 60M

PART-A

Answer all the Questions

5 x 2 = 10 M

- 1 a Determine the value of k, for the continuous function $f(x) = k x e^{-x}$ when $x \geq 0$. 2M
- b A fair coin is tossed six times. Find the Probability of getting four heads. 2M
- c Find the correlation coefficient 'r', for the regression lines x on y & y on x are $x = 0.854 y$ and $y = 0.89 x$. 2M
- d If $n = 100, \sigma = 5.1, \bar{x} = 21.6$ construct 95% confidence interval for population mean μ . 2M
- e Calculate the appropriate "test statistic" value for the following data $\bar{x} = 33.8, n = 60, \sigma = 3, \mu = 42$. 2M

PART-B

Answer all Five Units

5 x 10 = 50 M

UNIT-I

- 2 a If A and B are events with $P(A) = \frac{1}{3}, P(B) = \frac{1}{4}, P(A \cup B) = \frac{1}{2}$. 5M
- Determine (i) $P(B/A)$ (ii) $P(A/B^c)$
- b Compute c, mean, variance and S.D of the continuous random variable X whose probability density function is given by $f(x) = \begin{cases} c x(2-x), & \text{if } 0 \leq x < 2 \\ 0, & \text{otherwise} \end{cases}$ 5M

OR

- 3 a In a certain town 40% have brown hair, 25% have brown eyes and 15% have both brown hair and brown eyes. A person is selected at random from the town. 5M
- i) If he has brown hair, what is the probability that he has brown eyes also?
- ii) If he has brown eyes, determine the probability that he does not have brown hair.
- b If $F(x) = \begin{cases} 0, & \text{if } x \leq 1 \\ K(x-1)^4, & \text{if } 1 < x \leq 3 \\ 1, & \text{if } x > 3 \end{cases}$, then determine 5M
- (i) the probability density function of X
- (ii) K
- (iii) mean.

UNIT-II

- 4 a The mean and variance of a binomial distribution are 6 and 3 respectively. Calculate the mode of the binomial distribution. 5M
- b Out of 800 families with 5 children each, how many would you expect to have (i) 3 boys (ii) 5 girls (iii) either 2 or 3 boys. Assume equal probabilities for boys and girls. 5M

OR

- 5 Find the mean and variance of a Normal distribution in which 7% of items are under 35 and 89% are under 63. 10M

UNIT-III

- 6 Compute the first four central moments to the following data and also find Sheppard's correction, β_1 and β_2 . 10M

Class intervals	0-10	10-20	20-30	30-40	40-50	50-60	60-70
frequency	2	8	12	40	20	15	3

OR

- 7 a Evaluate the Karl Pearson's coefficient of correlation from the following data. 5M

Wages	100	101	102	102	100	99	97	98	96	95
Cost of Living	98	99	99	97	95	92	95	94	90	91

- b Calculate the correlation coefficient and regression coefficient for the following data. 5M

X	2	4	6	8	10	12	14
Y	4	2	5	10	4	11	12

Estimate y at x=13.

UNIT-IV

- 8 a Fit a $y = ax^b$ to the following data, also calculate $y(2.5)$ 5M

x	1	2	4	6
y	6	4	2	2

- b In a city A, 20% of a random sample of 900 school boys has a certain slight physical defect. In another city B, 18.5% of a random sample of 1600 school boys had the same defect. Analyze the difference between the proportions is significant at 0.05 level of significance or not. 5M

OR

- 9 a Find the curve of best fit of the type $y = ae^{bx}$ to the following data by method of least squares. 5M

x	1	5	7	9	12
y	10	15	12	15	21

- b Samples of students were drawn from two universities and from their weights in kilograms, mean and standard deviations are calculated and shown below. Make a large sample test to test the significance of the difference between the means. 5M

	Mean	S. D	Size of the sample
University A	55	10	400
University B	57	15	100

UNIT-V

- 10 The nicotine in milligrams of two samples of tobacco were found to be as follows. 10M

Sample A	24	27	26	23	25	--
Sample B	29	30	30	31	24	36

Can it be said that the two samples have come from the same normal population.

OR

- 11 4 coins were tossed 160 times and the following results were obtained. 10M

No. of Heads:	0	1	2	3	4
Observed frequencies:	17	52	54	31	6

Under the assumption that coins are unbiased, find the expected frequencies of 0, 1, 2, 3, or 4 heads, and test the goodness of fit ($\alpha = 0.05$).

END