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

**I MCA I Semester Regular Examinations January- 2020
PROBABILITY & STATISTICS**

Time: 3 hours

Max. Marks: 60

PART-A

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

UNIT-I

1. Two dice are thrown. Let A be the event that the sum of the point on the faces is 9. Let B be the event that at least one number is 6. **12M**
2. Find (i) $P(A \cap B)$ (ii) $P(A \cup B)$ (iii) $P(A^c \cup B^c)$ (iv) $P(A^c \cap B^c)$ (v) $P(A \cap B^c)$

OR

- 2 3a A sample of 4 items is selected at random from a box containing 12 items of which 5 are defective. Find the expected number E of defective items. **6M**
- b The diameter of an electric cable is assumed to be continuous random variable with probability density function $f(x) = 6x(1-x), 0 \leq x \leq 1$. Justify. Find the mean and variance of the distribution. **6M**

UNIT-II

- 3 1a If the probability that an individual suffers a bad reaction from a certain injection is 0.001, determine the probability that out of 2000 individuals (i) more than 2 individuals (ii) none (iii) more that one individual suffer a bad reaction. **6M**
- b The mean and standard deviation of the marks obtained by 1000 students in an examination are respectively 34.5 and 16.5. Assuming the normality of the distribution, find the approximate number of students expected to obtain marks between 30 and 60. **6M**

OR

4. In a sample of 1000 cases, the mean of certain test is 14 and standard deviation is 2.5. Assuming the distribution to be normal find **12M**
3. (i) How many students score between 12 and 15.
4. (ii) How many students score above 18?
5. (iii) How many students score below 18?

UNIT-III

- 5 Calculate the first four central moments of the following data. Also find Sheppard's correction. **12M**

Class intervals	10-20	20-30	30-40	40-50	50-60	60-70	70-80
frequency	1	20	69	108	78	22	2

OR

- 6 a From the following regression equations, calculate \bar{X}, \bar{Y} and $r, 20X-9Y=107, 4X-5Y=-33$ **6M**
- b Obtain the rank correlation coefficient for the following data : **6M**

X	68	64	75	50	64	80	75	40	55	64
Y	62	58	68	45	81	60	68	48	50	70

UNIT-IV

- 7 a Fit a straight line $y = ax + b$ for the following data. **6M**

x	71	68	73	69	67	65	66	67
y	69	72	70	68	68	67	68	64

- b Find the curve of best fit of the type $y = ae^{bx}$ to the following data by method of least **6M**

squares

x	0	1	2	3	4	5	6	7	8
y	20	30	52	77	135	211	326	550	1052

OR

- 8 a 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. 6M

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

- b Two random samples of sizes 100 each are drawn from two populations with the standard deviations 2.823 and 1.548. Test the significance difference between the sample standard deviations, if the population standard deviation is 2. 6M

UNIT-V

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

Sample	Size	Sample mean	Sum of the square of deviations from the mean
<i>Sample A</i>	24	27	90
<i>Sample B</i>	27	30	108

Test whether the samples came from the same normal population.

OR

- 10 a Scores obtained in a shooting competition by 10 soldiers before and after intensive training are given below: 6M

Before	67	24	57	55	63	54	56	68	33	43
After	70	38	58	58	56	67	68	75	42	38

- b The following table gives the classification of 100 workers according to sex and nature of work. Test whether the nature of work is independent of the worker ($\psi^2 = 3.84$ at 1 d.f) 6M

	Stable	Unstable	Total
Males	40	20	60
Females	10	30	40
Total	50	50	100

END