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**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)****B.Tech II Year II Semester (R16) Supplementary Examinations November 2018****Probability & Statistics**

(Common to CE, EEE, ME & CSE)

Time: **3 hours**Max. Marks: **60**(Answer all Five Units **5 X 12 = 60** Marks)**UNIT-I**

- 1 a. If X is a continuous random variable and k is a constant, then prove that 6M
 i) $Var(X + k) = Var(X)$ ii) $Var(kX) = k^2 Var(X)$.

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

- b. town. 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? 6M

OR

- 2 The probability density function of a random variable X is $f(x) = kx^2e^{-x}, x \geq 0$. 12M
 Find (i) k (ii) mean and (iii) variance.

UNIT-II

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

OR

- 4 a. Fit a Binomial distribution for the following data and calculate the expected frequencies. 6M

x	0	1	2	3	4	5	6
f	13	25	52	58	32	16	4

- b. In a sample of 1000 cases, the mean of a certain test is 14 and standard deviation is 2.5. Assuming the distribution to be normal, find 6M
 (i) how many students score between 12 and 15 ?
 (ii) how many students score above 18 ?
 how many students score below 18 ?

UNIT-III

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

- 5

<i>Sample A</i>	24	27	26	23	25	---
<i>Sample B</i>	29	30	30	31	24	36

12M

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

OR

- 6 Explain briefly (i) Type I error (ii) Type II error (iii) critical region. 12M

UNIT-IV

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

OR

8 A farmer applies three types of fertilizers on 4 separate plots. The figure on yield per acre are tabulated below

Plots	YIELD			
	A	B	C	D
Fertilizers				
Nitrogen	6	4	8	6
Potash	7	6	6	9
Phosphates	8	5	10	9

Find out if the plots are materially different in fertility, as also, if three fertilizers make any material difference in yields. 12M

UNIT-V

9 The following data show the values of sample means and ranges for 10 samples for size 5 each. Construct the control chart for mean, range and comment on the nature of control.

Sample No.	1	2	3	4	5	6	7	8	9	10
Mean (\bar{X})	12.8	13.1	13.5	12.9	13.2	14.1	12.1	15.5	13.9	14.2
Range (R)	2.1	3.1	3.9	2.1	1.9	3.0	2.5	2.8	2.0	2.5

12M

OR

10 The following are the figures of defectives in 22 lots each containing 2000 rubber belts:

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. 12M

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