Code No: RT22051 **R13** SET - 1

II B. Tech II Semester Supplementary Examinations, Dec - 2015
PROBABILITY AND STATISTICS
(Com. to CSE, IT, CHEM, PE, PCE)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART-A

1. a) A random variable X has the density function $f(x) = \begin{cases} \frac{K}{1+x^2} & if -\infty < x < \infty \\ 0 & otherwise \end{cases}$

Find K and the distribution function.

b) What are the two types of moments?

c) List the important properties of a good estimator

d) Explain χ^2 Test as a test of Goodness of fit.

e) Find the mean values of the variables X and Y and correlation coefficient from the following regression equations: 2Y-X-50=0;3Y-2X-10=0.

f) Write about the process $\bar{p}$-Chart. (4M+3M+4M+4M+4M+4M+3M)

PART-B

2. a) Let X be a Discrete random variable having the following probability distribution then

X	-2	-1	0	1	2	3
P(x)	0.1	K	0.2	2k	0.3	3k

Find (i) K (ii) Mean (iii) Variance

b) Explain "the characteristics of the normal distribution"? (8M+8M)

3. a) let X be the random variable with probability law: $p(X = r) = q^{r-1}p; r = 1,2,3,4 \ldots\ldots$

Find the moment generating function and hence mean and the variance (Assume p+q=1).

b) What is the Mathematical Expectation and its properties? (8M+8M)

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4. a) A sample of 11 rats from a central population had an average blood viscosity of 3.92 with a S.D of 0.61. Estimate the 95% Confidence limits in the mean blood viscosity of the population?

   b) A Normal population has a mean of 0.1 and Standard deviation of 2.1. Find the probability that mean of a sample of size 900 will be negative. (8M+8M)

5. a) A sample of 400 items is taken from a population whose S.D is 10. The mean of the sample Is 40. Test whether the sample has come from a population with mean 38. Also calculate 95% confidence interval for the population.

   b) in an investigation on the machine performance ,the following result are obtained:

	No. of units inspected	No of defectives
Machine-1	375	17
Machine-2	450	22

   Test whether is any significant performance of two machines at α=0.05 (8M+8M)

6. a) Calculate the regression equation of Y on X from the data given below, taking deviation from actual means of X and Y.

Price (Rs)	10	12	13	12	16	15
Amount Demanded	40	38	43	45	37	43

   b) Find the curve of best fit of the type $y = ae^{bx}$ to the following data by the method of least squares. (8M+8M)

x	2	4	6	8	10
Y	4.077	11.084	30.128	81.897	222.62

7. a) Explain the term statistical quality control. Discuss its aspects and advantage.

   b) The past records of a factory using quality control methods show that on the average 4 articles produced are defective out of a batch of 100. What is the maximum number of defective articles likely to be encountered in the batch of 400, when the production process is in state of control? (8M+8M)

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