

II B. Tech II Semester Supplementary Examinations, Nov/Dec-2016

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****PART-A**

1. a) Define random variable and cumulative distribution. Give an example of each.
- b) A coin is tossed until a tail appears. What is the expectation of the number of tosses?
- c) If we can assert with 95% that the maximum error is 0.05 and $p=0.2$, find the size of the sample.
- d) Write the application of t-test.
- e) Find the 'r' If $\sigma_x = \sigma_y = \sigma$ and the angle between the regression lines is $\tan^{-1} \frac{4}{3}$.
- f) What is change variation and assignable variation (3M+4M+4M+3M+4M+4M)

PART-B

2. a) A continuous Random variable X has the distribution function

$$F(x) = \begin{cases} 0 & \text{if } x \leq 1 \\ k(x-1)^2 & \text{if } 1 \leq x \leq 3 \\ 1 & \text{if } x > 3 \end{cases}$$

Find i) $f(x)$ ii) k iii) mean.

- b) Find the mean and standard deviation of a normal distribution in which 7% of items are under 35 and 89% are under 63. (8M+8M)

3. a) Find the moment generating function of the random variable whose moments are

$$M_r = (r+1)! 2^r$$

- b) let X be the a random variable with the following distribution.

x	-3	6	9
P(X=x)	1/6	1/2	1/3

Find $E[X]$, $E[X^2]$, $E[2X+1]^2$. (8M+8M)

4. A population consists of six numbers 4,8,12,16,20,24 consider all samples of size two. Which can be drawn without replacement from this population. Find
- The population mean.
 - The population standard deviation.
 - The mean of the sampling distribution of means.
 - The standard deviation of the sampling distribution of means.

(16M)

5. a) Write about

i) Critical region ii) Left tailed test iii) Right tailed test iv) Two tailed test.

- b) Three different machines are used for a production. On the basis of the outputs, set up One-way ANOVA table and hence, test whether the machines are equally effective. (8M+8M)

OUTPUTS		
Machine-I	Machine-II	Machine-III
10	9	20
5	7	16
11	5	10
10	6	14

6. a) By the method of least squares fit a parabola of the form $y=a+bx+cx^2$ to the following data.

X	2	4	6	8	10
Y	3.07	12.85	31.47	57.38	91.29

- b) Obtain the rank correlation coefficient for the following data.

(8M+8M)

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

7. a) Discuss the basic principles underlying control Charts. Explain in brief how control limits are determined for
- P-chart
 - C-chart.

- b) A drilling machine bores holes with a mean diameter of 0.5230 cm and a Standard deviation of 0.0032 cm. calculate the 2-sigma and 3-sigma upper and lower control limits for means of samples 4, and prepare a control Chart.

(8M+8M)
