Code No: R1621011   **R16**   SET - 1

II B. Tech I Semester Supplementary Examinations, May - 2019
PROBABILITY AND STATISTICS
(Civil Engineering)

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 **FOUR** Questions from **Part-B**
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PART –A

1. a) Define the Geometric distribution. (2M)

    b) Define moment generating function for a continuous random variable. (2M)

    c) Define F – distribution. (2M)

    d) Define Level of significance. (2M)

    e) Write procedure for test concerning difference between two means for large sample. (3M)

    f) Write the control line and three - sigma limits for the fraction-defective chart. (3M)

PART -B

2. Find moment generating function for binomial distribution and hence find its mean and variance. (14M)

3. a) Let X be a continuous random variable with distribution : (7M)

$$f(x)=\begin{cases} k\,x^2 & if\ 0\le x\le 1 \\ 0 & elsewhere \end{cases}$$

   (i) Evaluate k (ii) Find $p(1/4 \le X \le 3/4)$. (iii) Find $p(X > 2/3)$.

    b) Define the uniform distribution and find its mean and variance. (7M)

4. a) Determine the probability that $\overline{X}$ will be between 75 and 78 if a random sample of size 100 is taken from an infinite population having the mean $\mu = 76\ and\ \sigma^2 = 256$. (7M)

    b) Determine a 99% confidence interval for the mean of a normal distribution with variance $\sigma^2 = 9$, using a sample of $n = 100$ values with mean $\bar{x} = 5$. (7M)

5. a) A study shows that 16 of 200 tractors produced on one assembly line required extensive adjustments before they could be shipped, while the same was true for 14 of 400 tractors produced on another assembly line. At the 0.01 level of significance, does this support the claim that the second production line does superior work? (7M)

    b) Explain procedure for two-way classification of analysis of variance. (7M)

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6. The following are data on the drying time of a certain varnish and the amount   (14M)
of an additive that is intended to reduce the drying time:

Amount of varnish additive (grams) x	0	1	2	3	4	5	6	7	8
Drying time (hours) y	12.0	10.5	10.0	8.0	7.0	8.0	7.5	8.5	9.0

(i) Fit a second degree polynomial by the method of least squares.
(ii) Use the result of (i) to predict the drying time of the varnish when 6.5
grams of   the additive is being used.

7. The following data show the values of sample mean $\bar{X}$ and the range R of 20   (14M)
samples for The sample of size 4 each. Calculate the values for central line and
control limits for mean-chart and range chart and determine whether the
process is in control

Sample No.	1	2	3	4	5	6	7	8	9	10
$\bar{X}$	1.75	1.32	1.18	0.18	2.30	1.25	1.52	1.78	1.90	1.72
R	1.0	1.3	0.4	1.3	1.4	1.9	1.0	1.3	2.4	2.0
Sample No.	11	12	13	14	15	16	17	18	19	20
$\bar{X}$	2.40	3.20	2.52	2.05	1.68	2.00	1.28	1.92	1.00	1.35
R	1.9	2.7	1.7	0.6	0.5	3.1	2.6	2.7	1.0	1.7

Note :- Statistical tables and Control Chart Constants are required

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