

II B. Tech I Semester Supplementary Examinations, May/June - 2017
PROBABILITY AND STATISTICS
 (Civil Engineering)

Time: 3 hours

Max. Marks: 70

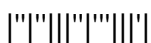
- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. Answer **ALL** the question in **Part-A**
 3. Answer any **THREE** Questions from **Part-B**
 4. Statistical tables are required
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PART -A

1. a) If a Poisson distribution is such that $P(X = 1) = \frac{3}{2}P(X = 3)$, find (i) $P(X \geq 1)$ (4M)
 (ii) $P(X \leq 3)$ (iii) $P(2 \leq X \leq 5)$.
- b) A sample of 4 items is selected at random from a box containing 12 items of which 5 are defective .Find the Expected number of defective items (4M)
- c) A sample size of 100 is taken from a population whose S.D is 16. Find the standard error and probable error (3M)
- d) In a random sample of 125 cola drinks , 68 said they prefer thumsup to Pepsi .Test the null hypothesis at $P = 0.5$ at 5% level of significance (4M)
- e) Calculate expected value of y when $x = 12$ if $\bar{x} = 7.6, \bar{y} = 14.8, \sigma_x = 3.6, \sigma_y = 2.5$ & $r = 0.99$ (4M)
- f) Write the procedure to compute R-chart (4M)

PART -B

2. a) Find the moment generating function of the random variable whose moments are $M_r = (r+1)!2^r$ (8M)
- b) Find the moment of generating function of a normal distribution (8M)
3. a) Let X denotes the minimum of the two numbers that appear when a pair of fair dice is thrown once. Determine the (i) Discrete probability distribution (ii) Expectation (iii) Variance (8M)
- b) In a Normal distribution, 31% of the items are under 45 and 8% are over 64 find the Mean and variance of distribution (8M)



4. a) Let $S = \{3, 6, 9, 15, 27\}$, find the probability distribution of the sample mean for a random sample size three drawn without replacement and also find (i) The mean of the sampling distribution of means (ii) The standard deviation of the sampling distribution of means (8M)
- b) A random sample of size 81 was taken whose variance is 20.25 and means is 32, construct 98% confidence interval (8M)
5. a) A sample of 100 electric bulbs produced by manufacturer 'A' showed a mean life time of 1190 hrs and an S.D. of 90 hrs A sample of 75 bulbs produced by manufacturer 'B' Showed a mean life time of 1230 hrs with S.D. of 120 hrs. Is there difference between the mean life times of the two brands at a significance level of 0.05 (8M)
- b) In an investigation on machine performance the following results are obtained (8M)

	No. of units inspected	No. of defectives
Machine I	375	17
Machine II	450	22

Test whether there is any significance performance of two machines at $\alpha = 0.05$.

6. a) Fit a second degree polynomial to the following data by the method of least squares: (8M)

X	10	12	15	23	20
Y	14	17	23	25	21

- b) Find the Multiple regression line to the following data (8M)

X	3	5	6	8	12	14
Y	16	10	7	4	3	2
Z	90	72	54	42	30	12

7. a) The number of defects on 20 items are given below (8M)
 Item No. 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20
 No. of defects: 2,0,4,1,0,8,0,1,2,0,6,0,2,1,0,3,2,1,0,2
 Devise a suitable control scheme for the future.
- 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)

