

Code No: RT22051

R13
SET - 1
II B. Tech II Semester Supplementary Examinations, April-2018
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) if  $X$  is a normal variate then Find (i)  $P(z < -1.78)$  (ii)  $P(-0.8 < z < 1.53)$
- b) The mean and variance of binomial distribution are 4 and 3 respectively.  
Find  $P(X \geq 1)$ .
- c) Explain the stratified sampling with a suitable example.
- d) A random sample of size 100 has S.D of 5 .what is the maximum error with 95% confidence
- e) Write about major classification of correlation?
- f) What is the use of control charts? Draw a typical control chart. (4M+4M+3M+4M+3M+4M)

**PART-B**

2. a) The probability density function of a variate  $X$  is

|      |   |    |    |    |    |     |     |
|------|---|----|----|----|----|-----|-----|
| X    | 0 | 1  | 2  | 3  | 4  | 5   | 6   |
| P(X) | K | 3K | 5K | 7K | 9K | 11K | 13K |

- (i) Find  $P(x < 4)$ ,  $P(3 < x \leq 6)$ .
- (ii) What will be the minimum value of  $K$  so that  $P(X \leq 2) > 0.3$
- b) In a test on 2000 electric bulbs, it was found that the life of a particular make was normally distributed with average life of 2040 hours and S.D of 60 hours . Estimate the number of bulbs likely to burn for
  - i) More than 2150 hours,
  - ii) Less than 1950 hours and
  - iii) More than 1920 hours and but less than 2160 hours.

(8M+8M)

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3. a) Calculate  $E(X)$ ,  $E(X^2)$ ,  $E(X - \bar{X})^2$  from the distribution given below.

|      |     |      |     |
|------|-----|------|-----|
| X    | 1   | 2    | 3   |
| P(X) | 1/5 | 3/10 | 1/2 |

- b) Define Moment generating function and its properties.

(8M+8M)

4. a) A random samples of size 25 from a normal population has the mean  $\bar{x} = 47.5$  and the standard deviation is equal to 8.4. Does this information tend to support or refute the claim that the mean Of population is  $\mu = 42.5$

- b) Three masses are measured as 62.34, 20.48, 35.97kgs with S.D 0.54, 0.21, 0.46 kgs respectively. Find mean and standard deviation of the sum of the masses

(8M+8M)

5. a) Two independent samples of 8 and 7 items respectively has the following values

|         |    |    |    |    |    |   |    |      |
|---------|----|----|----|----|----|---|----|------|
| Sample1 | 11 | 11 | 13 | 11 | 15 | 9 | 12 | 14   |
| Sample2 | 9  | 11 | 10 | 13 | 9  | 8 | 10 | ---- |

Is the difference between the mean of samples significant?

- b) A sample of 26 bulbs gives a mean life of 990 hours with a S.D of 20 hours.

The manufacturer claims that the mean life of bulbs is 1000 hours is the sample not up to the standard.

(8M+8M)

6. a) Calculate Karl Pearson's correlation coefficient for the following paired data.

|   |    |    |    |    |    |    |    |    |    |    |
|---|----|----|----|----|----|----|----|----|----|----|
| X | 28 | 41 | 40 | 38 | 35 | 33 | 40 | 32 | 36 | 33 |
| Y | 23 | 34 | 33 | 34 | 30 | 26 | 28 | 31 | 36 | 38 |

- b) Fit a parabola of the form  $y = a + bx + cx^2$  to the following data

(8M+8M)

|   |    |     |     |      |      |      |      |
|---|----|-----|-----|------|------|------|------|
| x | 1  | 2   | 3   | 4    | 5    | 6    | 7    |
| y | 23 | 5.2 | 9.7 | 16.5 | 29.4 | 35.5 | 54.4 |

7. Construct a control chart for men and the range for the following data on the basis of fuses, sample of being taken every hour ( each set of 5 has been arranged in ascending order of magnitude). Comment on whether the production seems to be under control, assuming that these are the first data.

|    |    |    |    |    |     |     |    |    |     |     |     |
|----|----|----|----|----|-----|-----|----|----|-----|-----|-----|
| 42 | 42 | 19 | 36 | 42 | 51  | 60  | 18 | 15 | 69  | 64  | 61  |
| 65 | 45 | 24 | 54 | 51 | 74  | 60  | 20 | 30 | 109 | 90  | 78  |
| 75 | 68 | 80 | 69 | 57 | 75  | 72  | 27 | 39 | 113 | 93  | 94  |
| 78 | 72 | 81 | 77 | 59 | 78  | 95  | 42 | 62 | 118 | 109 | 109 |
| 87 | 90 | 81 | 84 | 78 | 132 | 138 | 60 | 84 | 153 | 112 | 136 |