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

II B. Tech II Semester Supplementary Examinations, November-2017
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) Sketch the probability density function and the probability distribution function of Weibull distribution

   b) Show that the moment generating function of a normal distribution is $e^{\mu t+(\sigma^2 t^2/2)}$

   c) What is the effect on standard error, if a sample is taken from an infinite population of sample size is increased from 400 to 900.

   d) Short notes on type I and type II Error.

   e) Write the difference between correlation and regression.

   f) Write about the process C-Chart. (4M+4M+4M+3M+4M+3M)

PART-B

2. a) If X is continuous Write random variable with probability density function

   $f(x)=\begin{cases} \frac{1}{2}\sin x, & for\ 0 \le x \le \pi \\ 0 & elsewhere \end{cases}$

   Find the mean, mode, median of the distribution.

   b) Define i) Random variable ii) Discrete probability distribution iii) continuous probability distribution iv) cumulative distribution. With suitable examples (8M+8M)

3. a) Show that $E(X-m)^3 = E(X^3) - 3m\sigma_x^2 - m^3$ where m and σ_x^2 are the mean and variance of respectively.

   b) Prove that moment generating function of a random variable X defined by the density function $f(x) = \begin{cases} \frac{1}{3}, -1 < x < 2 \\ 0 \quad elsewhere \end{cases}$ is $M(t) = \begin{cases} \frac{e^{2t}-e^{-t}}{3t} & t \neq 0 \\ 1 & t = 0 \end{cases}$ (8M+8M)
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4. a) What is the size of the smallest sample required to estimate an unknown proportion to within a maximum error of 0.06 with at least 95% confidence.

   b) The mean of certain normal distribution is equal to the standard error of the mean of the samples of 64 from the distribution. Find the probability that the mean of the sample size will be negative. (8M+8M)

5. a) A manufacturer of electronic equipment subjects samples of two completing brands of transistors to an accelerated performance test. If 45 of 180 transistors of the first kind and 34 of 120 transistors of the second kind fail the test, What can be conclude at the level of significance is 0.05, about the difference between the corresponding sample proportions?

   b) In a big city 325 men out of 600 men were found to be smokers. Does this information supports the conclusion that the majority of men in this city are smokers? (8M+8M)

6. a) Find the curve of best fit of the type $y = ae^{bx}$ to the following data by the method of least squares.

x	1	5	7	9	12
Y	10	15	12	15	21

   b) Find the coefficient of correlation between X and Y

X	1	2	3	4	5	6	7	8	9
Y	12	11	13	15	14	17	16	19	18

(8M+8M)

7. a) The following data gives reading 10 samples of size 6each in the production of a certain component.

Sample	1	2	3	4	5	6	7	8	9	10
Mean	383	508	505	582	557	337	514	614	707	753
Range	95	128	100	91	68	65	148	28	37	80

   Draw control Charts for $\bar{X}$ (for n = 6, $A_2 = 0.483$. what is your conclusion.)

   b) Explain Statistical quality control (SQC). (8M+8M)