Code No: R22011 **R10** SET - 1

II B. Tech II Semester Supplementary Examinations, Dec - 2015
PROBABILITY AND STATISTICS
(Com. to CE, CHEM, PE)

Time: 3 hours Max. Marks: 80

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) If A and B are mutually exclusive events P(A)=4P(B) and $A \cup B = S$, Find (7M)
i) $p(A^c \cap B)$ ii) $p(A \cap B^c)$ iii) $p(A^c \cap B^c)$
b) Three machines I, II, III produce 40%, 30%, 30% of the total number of items of a factory. The percentages of defective items of these machines are 4%, 2% 3%. If an item is selected at random, Find the probability that the item is defective. (8M)

2. a) The probability density function of a variate X is (8M)

X	0	1	2	3	4	5	6
P(X)	k	3k	5k	7k	9k	11k	13k

(i) Find K.
(ii) Find P(X<4), P(X≥5), p(3<X≤6)
(iii) What will be the minimum value of K so that p(X≤2)>0.3?
b) Probability density function of a random variable X is (7M)
$f(x) = \begin{cases} 1/2\sin x, 0 \le x \le \pi \\ 0, elsewhere \end{cases}$. Find the mean and variance of the distribution.

3. a) If the probability of success is 1/20, how many trials are necessary in order that the probability of at least one success is just greater than ½? (7M)
b) Derive the mean, mode and median of normal distribution. (8M)

4. a) The average cost of a studio condominium in the cedar lakes development is Rs 62,000 and the S.D is Rs.4200. What is the probability that condominium in this development will cost at least R s. 65,000? (7M)
b) A random sample 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 μ=42.5? (8M)
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5. a) Write working procedure for testing of hypothesis concerning difference of means for small samples. (7M)

   b) A sample of 900 members has a mean 3.4 cms and standard deviation 2.61cms. Is this sample has been taken from a large population of mean 3.25 cms and S.D 2.61 cms, if the population is normal and its mean is unknown, find the 95% and 98% confidence limits of the true mean? (8M)

6. a) Test whether the intelligence of sons depends on the intelligence father's from the following data, using χ^2 test at 0.05 level (7M)

   Intelligence fathers with intelligence sons=200

   Intelligence fathers with intelligence sons=50

   Dull fathers with intelligence sons=110

   Dull father with dull sons =600

   b) A random Sample of 10 bages of pesticides are taken whose weight are 50, 49, 52,44,45,48,46,45,49,45(in kgs). Test whether the average packing can be taken to be 50kgs. (8M)

7. a) Determine the constants 'a' and 'b' by the method of least squares such that $y = ae^{bx}$ fits the following data (7M)

X	2	4	6	8	10
y	4.077	11.084	30.128	81.897	22.62

   b) What is the use of control charts? Draw a typical control chart. (8M)

8. a) Explain about Queuing Characteristics. (7M)

   b) Consider a single server queuing system with poisson input and exponential service time. Suppose the mean arrival rate is 3 calling units per hour with the expected service time as 0.25 hours and the maximum permissible number of calling units in the system is two obtained the steady state probability distribution of the number of calling units in the system is and then calculate the expected number in the system. (8M)