Code: IT3T3

II B.Tech - I Semester – Regular Examinations – December 2015

PROBABILITY AND STATISTICS
(INFORMATION TECHNOLOGY)

Duration: 3 hours   Max. Marks: 70

PART – A

Answer *all* the questions.   All questions carry equal marks

$$11 \times 2 = 22 \text{ M}$$

1. a) Find the probability of getting a sum of 12 if we throw three dice.

   b) State Baye's theorem

   c) If $f(x) = kx^3$ for $0 < x < 1$ *and* $f(x) = 0$ *otherwise,* is a valid probability density function, find k.

   d) Determine the binomial distribution for which the mean is 4 and variance 3.

   e) If X is a Poisson variate such that $P(X = 2) = \frac{2}{3} P(X = 1)$ find $P(X = 0)$.

   f) Define sampling distribution of the mean.

   g) A random sample of size 100 has standard deviation 5. Find the maximum error of the mean with 95% confidence.

   h) Explain one tailed test.

   i) Write the test formula for testing hypothesis concerning difference of two proportions.

   j) State the identity for one way analysis of variance

   k) Write the critical region for testing one variance hypothesis in two tailed test.

PART – B

Answer any **THREE** questions. All questions carry equal marks. $3 \times 16 = 48$ M

2. a) A box contains 4 balls. Two balls are drawn from it and found to be white. Find the probability that all the balls in the bag are white.   8 M

   b) Let X be a random variable having the density function

   $$f(x) = \begin{cases} cx & 0 \leq x \leq 2 \\ 0, & otherwise \end{cases}$$ 8 M

   Find   i) the constant c

   ii) $P\left(\frac{1}{2} < X < \frac{3}{2}\right)$ iii) $P(X > 1)$

3. a) Six dice are thrown 729 times. How many times do you expect at least three dice show 5 or 6.   8 M

   b) In a Normal distribution, 7% of the items are under 35 and 89% of the items are under63. Find the mean and standard deviation.   8 M

4. a) A random sample of size 64 is taken from a normal population with mean 51.4 and standard deviation 6.8. Find the probability that the mean of the sample will   8 M
   i) exceed 52.9   ii) fall between 50.5 and 52.3

b) Among 900 people in a state 90 are found to be blind. Construct 98% confidence interval for the true proportion.

8 M

5. a) An ambulance service claims that it takes on the average less than 10 minutes to reach its destination in emergency calls. A sample of 36 calls has a mean of 11 minutes and the variance of 16 minutes. Test the significance at 0.05 level.

8 M

b) Random samples of 400 men and 600 women were asked whether they would like to have a flyover near their residence. 200 men and 325 women were in favor of the proposal. Test the hypothesis that the proportions of men and women in favor of the proposal are same at 5% level.

8 M

6. a) Fit a Poisson distribution to the following data and test for its goodness of fit at 5% level of significance. 8 M

X	0	1	2	3	4
F	419	352	154	56	19

b) If 12 determinations of the specific heat of iron have a standard deviation of 0.0086. Test the null hypothesis $\sigma = 0.010$ for such determinations. Use the alternative hypothesis $\sigma \neq 0.010$ and the level of significance $\alpha = 0.01$

8 M