$\boxed{\textbf{R5}}$

II B.Tech I Semester(R05) Supplementary Examinations, December 2009
### PROBABILITY AND STATISTICS
(Common to Computer Science & Engineering, Information Technology and Computer Science &
Systems Engineering)

**Time: 3 hours**                                                                                       **Max Marks: 80**
### Answer any FIVE Questions
### All Questions carry equal marks
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1. (a) Define a random experiment, sample space, event and mutually exclusive events. Give examples of each.
   (b) Box A contains 5 red and 3 white marbles and box B contains 2 red and 6 white marbles.
       i. If a marble is drawn from each box, what is the probability that they are both of the same colour?
          [8+8]

2. (a) Find the variance of the binomial distribution .
   (b) Determine the probability distribution of the number of bad eggs in a basket containing 6 eggs given that 10% of eggs are bad in a large consignment                                                          [8+8]

3. (a) Define Poisson distribution and find its variance and the mean.
   (b) Find the mean and standard deviation of a normal distribution in which 7% of items are under 35 and 89% are under 63.                                                                                          [8+8]

4. Samples of size 2 are taken from the population 4, 8, 12, 16, 20, 24 without replacement. Find
   (a) mean of the population
   (b) standard deviation of population
   (c) the mean of sampling distribution of means
   (d) standard deviation of sampling distribution of means.                                              [16]

5. (a) Experiences had shown that 20% of a manufactured product is of the top quality. In one days production of 400 articles only 50 are of top quality. Test the hypothesis at .05 level.
   (b) If the mean breaking strength of copper wire is 505 lbs with a standard deviation of 15 lbs. The sample is 49 construct 95% confidence interval for the mean.
   (c) If the standard deviation of a sample is 20 and the maximum error with 99% confidence is 1.72. How large the sample might be?                                                                                 [5+5+6]

6. Given below is the number of male births in 1000 families having five children.

| Male children | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| No of families | 40 | 300 | 250 | 200 | 30 | 180 |

   Test whether the given data is consistent with the hypothesis that the chance of male birth is equal to the chance of female birth.                                                                                [8+8]

7. Fit an equation of the form Y=$ab^x$ to the following data:                                            [16]

| x: | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|
| y: | 144 | 172.8 | 207.4 | 248.8 | 298.5 |

8. Two independent variables x and y have means 5 and 10 and variances 4 and 9 respectively. Find the coefficient of correlation between u and v where
   (a) u = 3x+4y , v =3x-y
   (b) If x and y are not independent and r=0.5 , u = x+y , v= x-y                                        [8+8]

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