

Code: 9ABS401

II B. Tech I Semester (R09) Supplementary Examinations, May 2012

PROBABILITY & STATISTICS

(Mechatronics)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions
All questions carry equal marks

- 1 (a) One card is drawn from a regular deck of 52 cards. What is the probability of card being either red or a king?
(b) A bag contains 12 balls numbered from 1 to 12. If a ball is taken at random what is the probability of having a ball with a number which is a multiple of either 2 or 3.
- 2 Determine the expected number of families to have (a) 2 boys and 2 girls (b) at least one boy (c) no girls (d) at most two girls, out of 800 families with 4 children each. Assume equal probabilities for boys and girls.
- 3 A student takes a true or false examination consisting of 8 questions. He guesses each answer. The guesses are made at random. Find the smallest value of n that the probability of guessing atleast n correct answers is less than $\frac{1}{2}$.
- 4 Take 30 slips of paper and label 5 each -4 and 4, from each -3 and 3, three each -2 and 2 and each -1, 0 and 1. If each slip of paper has the same probability of being drawn find the probabilities of getting -4, -3, -2, -1, 0, 1, 2, 3, 4 and find the mean and variance of this distribution.
- 5 (a) A random sample of 100 teachers in a large metropolitan area revealed a mean weekly salary of Rs. 487 with S.D. Rs. 48. With what degree of confidence can we assert that the average weekly salary of all teachers in all area is between 472 to 502.
(b) A population random variable has mean 100 and S.D. 16. What are the mean and S.D. of the sample mean for the random sample of size 4 drawn with replacement?
- 6 (a) What is meant by level of significance?
(b) In a sample of 1000 people in Karnataka 540 are rice eaters and rests are wheat eaters. Can we assume that both rice and wheat are equally popular in this state at 1% level of significance.
(c) It is claimed that a random sample of 49 tires has a mean life of 15200 kms. This sample was drawn from a population whose mean is 15150 kms. And a S.D. of 1200 kms. Test the significance at 0.05 level.
- 7 A random sample of a company's very extensive files show that the orders for a certain kind of machinery were filled, respectively in 10, 12, 19, 14, 15, 18, 11 and 13 days. Use $\alpha = 0.01$ level of significance to test the claim that on average such orders are filled in 10.5 days. Assume normality.
- 8 At a railway station, only one train is handled at a time. The railway yard is sufficient only for two trains to wait while other is given to leave the station. Trains arrive at the station at an average rate of 6 per hrs. and the railway station can handle on an average of 12 per hrs. Assuming Poisson arrivals and exponential service distribution, find the steady state probabilities for the various number of trains in the system. Find also the average waiting time of a new coming into yard.
