Assignment 2

1. A class Consists of 6 girls and 10 boys. If a committee of three is chosen at random from the class, find the probability that (i) three boys are selected and (ii) exactly two girls are selected

2. A person applies for a job in two firms A and B, the probability of his being selected in the firm A is 0.7 and being rejected in the firm B is 0.5. The probability of at least one of the applications being rejected is 0.6. What is the probability that he will be selected in one of the two firms?

3. A bag contains 3 red and 4 white balls. Two draws are made without replacement. What is the probability that both the balls are red?

4. Data on readership of a certain magazine show that the proportion of male readers under 35 is 0.40 and that over 35 is 0.20. If the proportion of readers under 35 is 0.70, find the probability of subscribers that are females over 35 years. Also, Calculate the probability that a randomly selected male subscriber is under 35 years of age.

5. A businessman goes to hotels X, Y, Z for 20%,50%,30% of the time respectively. It is known that 5%,4%,8% of the rooms in X, Y, Z hotels have family plumbing. What is the probability that the businessman's room having faulty plumbing is assigned to hotel Z?

6. A factory has two machines, A and B. Past records show that the machine A produces 30% of the total output and the machine b, the remaining 70%. Machine A produces 5% defective articles and Machine B produces 1% defective items. An item is drawn at random and found to be defective. What is the probability that it was produced (i) by the machine A, and (ii) by the machine B?

7. The probability distribution of a random variable X is given as follows:

X	-2	-1	0	1	2
$P(X = x)$	0.2	0.1	0.3	0.3	0.1

Find (i)$E(X)$ (ii)$V(X)$ (iii) $E(2X - 3)$ (iv)$V(2X - 3)$.

8. There are two defective pencils in a pack of dozen pencils. If three pencils are taken at random, find the probabilities that (i) at the most one pencil is defective (ii) two pencils are defective.

9. A sample of 3 items is selected at random from a box containing 10 items of which 4 are defective. Find the expected number of defective items.

10. Let X be a continuous random variable with pdf f(x)=kx(x-1), 0≤x≤1 then find the value of k.

11. Let the continuous random variable X have the probability density function

$$f(x) = \begin{cases} \dfrac{2}{x^3} & 1 < x < \infty \\ 0 & otherwise \end{cases}$$

Find F(x).

12. The incidence of an occupational disease in an industry is such that the workers have a 20% chance of suffering from it. What is the probability that out of 6 workers chosen at random, four or more will suffer from the disease?

13. The probability that a patient will get reaction of a particular injection is 0.001. If 2000 patients are given that injection. Find the probabilities that (i) 3 patients will get reaction (ii) more than 2 patients will get reaction.

14. The distribution of the number of road accidents per day in a city is Poisson with a mean of 4. Find the number of days out of 100 days when there will be (i) no accident, (ii) at least 2 accidents, (iii) at most 3 accidents.

15. The expenditures on breakfast of customers of a restaurant follow normal distribution with mean Rs.200 and standard deviation Rs.50. On a particular day 40 customers spent more than Rs.275, find the expected number of customers visited the restaurant on that day.

16. A coin is tossed 900 times. Find the probability that the number of heads is between 435 and 465.

17. The daily profit of a businessmen is Rs.120 and the s.d. of the profit is Rs.15. Find the number of days out of 365 days on which his profit will be less than Rs.100.