Pondicherry University
Department of Computer Science
M.Sc. I Sem- Probability and Statistics

Marks: 25
Time: 90 minutes

Answer Any 5 Questions: (5*5 = 25)

1. i) Explain Poisson Distribution

ii) The average number of traffic accidents on a certain section of highway is two per week. Assume that the number of accidents follows a Poisson distribution with $\mu=2$.

a. Find the probability of no accidents on this section of highway during a 1-week period.

b. Find the probability of at most three accidents on this section of highway during a 2-week period.

2. i) Write notes on Normal Distributions.

ii) The mean weight of 500 male students at a certain college is 151 lb and the standard deviation is 15 lb. Assuming that the weights are normally distributed, find how many students weight

a) between 120 lb and 155 lb b) more than 185 lb.

3. i) The Density function of a random variable X is given by

$$f(x)=\begin{cases} 1/2x, & 0 < x < 2 \\ 0, & otherwise \end{cases}$$

a. Find the expected value of x.

b. Find the variance and Standard Deviation of X.

ii) Write notes on moments of a Random Variable.

4. The Joint Density function of two random variables X and Y is given by

$$f(x,y)=\begin{cases} xy/96, & 0 < x < 4,\ 1 < y < 5 \\ 0, & otherwise \end{cases}$$

Find (a) E(X), (b) E(Y), (c) E(XY), (d) E(2X+3Y)

5. Find the probability that in five tosses of a fair die, a 3 will appear

b) twice b) at most once c) at least two times.

6. i) A population consists of five numbers 2,3,6,8,11. Consider all possible samples of size two which can be drawn with replacement from this population. Find the mean of the sampling distribution of means.

ii) Define Law of large numbers and standard error

7. Assume that the heights of 3000 male students at a university are normally distributed with mean 68.0 inches and standard deviation 3.0 inches. If 80 samples consisting of 25 students each are obtained, what would be the mean and standard deviation of the resulting sample of means if sampling were done a) with replacement.