IV CS/IT Assignment III

1. In a bombing action, there is 50% chance that any bomb will strike the target. Two direct hits are needed to destroy the target completely. How many bombs are required to be dropped to give a 99% chance or better of destroying the target?

2. A sortie of 20 aero-planes is sent on an operational flight. The chances that an aero-plane fails to return is 5%. Find the probability that

   i) one plane does not return
   ii) at the most 5 planes do not return and
   iii) what is the most probable number of returns?

3. A car hire firm has 2 cars which it hires out day by day. The number of demands for a car on each day is distributed as a Poisson variate with mean 1.5. Calculate the proportion of days on which i) neither car is used and ii) some demand is refused.

4. In a normal distribution, 31% of the items are under 45 and 8% are over 64. Find the mean and variance of the distribution.

5. A fair coin is tossed 500 times. Find the probability that the number of heads will not differ from 250 by i) more than 10 and ii) more than 30.

6. The increase in sales per day in a shop is exponentially distributed with Rs. 800 as the average. If sales tax is at the rate of 6%, find the probability that the increase in sales tax will exceed Rs. 30 per day?

7. Obtain the mean and variance of Gamma Distribution.

8. The daily consumption of milk in a city in excess of 20,000 gallons is approximately distributed as a Gamma distribution with mean 20,000 and variance $2(10,000)^2$. The city has a daily stock of 30,000 gallons. What is the probability that the stock is insufficient in a particular day?

9. Suppose that the life lengths of 2 electronic devices D_1 and D_2 have distributions N(40,36) and N(45,9) respectively. If the electronic device is to be used for 45 hours period, which device is to be preferred? If it is to be used for a 48 hours period, which device is to be preferred?

10. If X has distribution $N(\mu,\sigma^2)$ and if $Y=(X-\mu)/\sigma$, then prove that Y has distribution N(0,1).