1. **[15pts]** An assembly consists of three mechanical components. Suppose that the probabilities that the first, second, and third components meet specifications are 0.8, 0.75, and 0.6, respectively. Assume that the components are independent. Determine the probability mass function of the number of components in the assembly that meet specifications.

2. **[15pts]** (Please provide necessary R statements) The phone lines to an airline reservation system are occupied 40% of the time. Assume that the events that the lines are occupied on successive calls are independent. Assume that 15 calls are placed to the airline.

   (a) What is the probability that for exactly three calls, the lines are occupied?

   (b) What is the probability that for at least four calls, the lines are not occupied?

   (c) What is the expected number of calls in which the lines are all occupied?

3. **[15pts]** (Please provide necessary R statements) Assume that each of your calls to a popular radio station has a probability of 0.05 of connecting, that is, of not obtaining a busy signal. Assume that your calls are independent.

   (a) What is the probability that your first call that connects is your 12th call?

   (b) What is the probability that your third call that connects is your 12th call?

   (c) What is the probability that it requires more than 12 calls for you to get four connects?

4. **[15pts]** (Please provide necessary R statements) A utility company might offer electrical rates based on time-of-day consumption to decrease the peak demand in a day. Enough customers need to accept the plan for it to be successful. Suppose that among 100 major customers, 30 would accept the plan. The utility selects 15 major customers randomly (without replacement) to contact and promote the plan.

   (a) What is the probability that exactly four of the selected major customers accept the plan?

   (b) What is the probability that at least four of the selected major customers accepts the plan?

5. **[15pts]** (Please provide necessary R statements) The number of surface flaws in plastic panels used in the interior of automobiles has a Poisson distribution with a mean of 0.06 flaw per square foot of plastic panel. Assume that an automobile interior contains 10 square feet of plastic panel.

   (a) What is the probability that there are no surface flaws in an auto's interior?

   (b) What is the probability that more than two surface flaws in an auto's interior?