1. Note: Let l be the last digit of your roll number. Consider a medical practitioner pondering the following dilemma: "If I am at least $(l+3)0$ (take $(l+3)$ (mod 10) if $l+3 \geq 10$) percent certain that my patient has this disease, then I always recommend surgery, whereas if I'm not quite as certain, then I recommend additional tests that are expensive and sometimes painful. Now, initially I was only $(l+1)0$ (take $(l+1)$ (mod 10) if $l+1 \geq 10$) percent certain that Jones had the disease, so I ordered the series A test, which always gives a positive result when the patient has the disease and almost never does when he is healthy. The test result was positive, and I was all set to recommend surgery then Jones informed me, for the first time, that he was diabetic. This information complicates matters because, although it doesn't change my original 60 percent estimate of his chances of having the disease in question, it does affect the interpretation of the results of the A test. This is so because the A test, while never yielding a positive result when the patient is healthy, does unfortunately yield a positive result 30 percent of the time in the case of diabetic patients who are not suffering from the disease. Now hat do I do? More tests of immediate surgery?"

2. Let l be the last digit of your roll number. Four buses carrying 148 students from the same school arrive at a football stadium. Two buses carry, respectively, $40, 33, 25$, and 50 students. One of the students is randomly selected. Let X denote the number of students that were on the bus carrying the randomly selected student. One of the 4 bus drivers is also randomly selected. Let Y denote the number of students on her bus.

   1. Which of $E[lX]$ or $E[lY]$ do you think is larger? Why?
   2. Compute $E[lX]$ and $E[lY]$.

3. Let l be the last digit of your roll number. A bus travels between the two cities A and B, which are $l00$ miles apart. If the bus has a breakdown, the distance from the breakdown to city A has a uniform distribution over $(0, l00)$. There is a bus service station in city A, in B, and in the center of the route between A and B. It is suggested that it would be more efficient to have the three stations located $2l, 5l$, and $7l$ miles, respectively, from A. Do you agree or not? Why?

4. Let l be the last digit of your rolle number. An insurance company has $l0,000$ automobile policyholders. The expected yearly claim per policy holder is 240 rupees, with a standard deviation of 800 rupees. Approximate the probability that the total yearly claim exceeds 2.7 million.

5. Let l be the last digit of your roll number

   1. A personnel, manager claims that $(l+3)0$ (take $(l+3)$ (mod 10) if $l+3 \geq 10$) percent of all single person hired for secretarial job get another job and quit work within two years after they are hired. Test this hypothesis at 5% level of significance if among 200 such secretaries, 112 got another job within two years after they were hired and quit their jobs.
   2. A manufacturer claimed that at least $(l+2)8\%$ (take $(l+2)$ (mod 10) if $l+2 \geq 10$) of the steel pipes which he supplied to a factory conformed to specifications. An examination of a sample of 500 pieces of pipes revealed that 30 were defective. Test this claim at a significance level of $(i)005$, $(ii)001$.