



## SECTION I

2. It is known from past experience that in a certain plant there are on the average 4 industrial accidents per month. Find the probability that in a given year there will be less than 4 accidents. Assume poisson distribution ( $e^{-4} = 0.0183$ ). (10)
3. Let  $X$  be a normal variable with standard deviation 10 and mean 50. Find the probability that
- $X$  lies between 30 and 60
  - $X \geq 75$
  - $X \leq 45$  (10)

## SECTION II

4. Out of 400 persons who were given a flu vaccine, 136 experienced some discomfort. Construct a 95% confidence interval for the true proportion of persons who will experience some discomfort from the vaccine. (10)
5. An electrical firm manufactures light bulbs that have a length of life that is approximately normally distributed, with mean equal to 800 hours and a standard deviation of 40 hours. Find the probability that a random sample of 16 bulbs will have an average life of less than 775 hours. (10)

## SECTION III

6. Two random samples drawn from two normal populations are

**Sample 1 :** 20 16 26 27 23 22 18 24 25 19

**Sample 2 :** 27 33 42 35 32 34 38 28 41 43 30 37

Test if the two populations have the same variance at 5% level of significance.

Given that  $F_{0.05,9,11} = 3.1$ . (10)

7. The average concentration of zinc recovered from samples of zinc measurement from 36 different locations in a river is found to be 2.6 grams per milliliter. Find a 95% and a 99% confidence interval for the mean zinc concentration in the river. Assume that the population standard deviation is 0.3. Given  $Z_{0.025} = 1.96$  and  $Z_{0.005} = 2.575$ . (10)

(200)