TEST YOUR SKILLS-1

Time : 1 hr. **M.M. :** 40

Section - B (4 marks each)

1. A and B are two candidates seeking admission in a college. The probability that A is selected, is 0.7 and the probability that exactly one of them is selected, is 0.6. Find the probability that B is selected.
2. On an average 4 vessels out of every 12 are wrecked while transportation. If 8 vessels are to be transported. Find the probability that atleast two will reach safely.
3. A student appears in an examination with three subjects A, B and C. His probabilities of passing these subjects are $\frac{1}{2}, \frac{1}{3}$ and $\frac{1}{4}$. To qualify he must pass in A and atleast one other subject. Find the probability that he qualifies.
4. Three cards are drawn from a pack of 52 cards.
   (A) Find the probability that no two of the drawn cards are of same suit.
   (B) Find the probability that all three cards are of same suit.
5. Assume that in a family, each child is equally likely to be a boy or a girl. A family with three children is chosen at random. Find the probability that youngest child is a girl, given that the family has at least one boy and one girl.

Section - C (6 marks each)

6. A bag contains 4 red and 2 black balls. Three balls are drawn one by one with replacement from the box. From the P.D. of number of black balls. Also, find mean variance and S.D. of number of black balls.
7. There are 8 apples in a basket of which 25% are rotten. If three apples are selected from the basket, from the P.D. of number of rotten apples. Also, find the expected value of number of rotten apples.
8. If a machine is correctly set it produces 80% good items and remaining defective. If it is wrongly set it produces only 40% good items and remaining defective. It is known that 60% of the setups are correctly done by engineers. If machine is set and then two items are produced and are found to be one good and one defective, find the probability that machine was not correctly set.
9. A laboratory blood test is 99% effective in detecting a certain disease when it is in fact, present. However, the test also yields a false positive result for 0.5% of the healthy person tested. If 0.1% of the population actually has the disease, what is the probability that a person has the disease given that his test result is positive?
10. Let X be a discrete random variable whose P.D. is defined as

$$P(X = x) = \begin{cases} k(2x-1) & \text{for } x = 1, 2, 3 \\ kx & \text{for } x = 4, 5 \\ 0 & \text{otherwise} \end{cases}$$

Find : (A) $E(X)$,
(B) standard deviation of X.

10. In a hockey match, both teams A and B scored same number of goals up to the end of the game, so to decide the winner, the referee asked both the captains to throw a dice alternatively and decided that the team, whose captain gets a six first, will be declared the winner. If the captain of team A was asked to start, find their respective probabilities of winning the match and state whether the decision of the referee was fair or not.

[Delhi 2013 (C)]