

Note:

1. All questions are compulsory.
2. Figure to the right indicate marks.
3. Use of calculator is allowed.

Q1. Attempt any 2 from the following.

1. A uniform die with its faces numbered 1 to 6 is thrown. Find the probability of getting on the uppermost face (5)
  - (i) number 1
  - (ii) an odd number
  - (iii) a number less than 3
  - (iv) a number greater than 3.
2. A committee of 3 is to be formed from among 5 boys and 3 girls. (5)
 

What is the probability that the committee shall have

  - (i) no boy
  - (ii) 2 boys and 1 girl
  - (iii) at least one boy
  - (iv) more girls than the number of boys.
3. A uniform die is thrown. Let A: number on the uppermost face is even. Find  $P(2/A)$ ,  $P(1/A)$ ,  $P(\text{multiple of } 3/A)$ . (5)

Q2. Attempt any 2 from the following.

1. The probability mass function of a random variate X is given by (5)
 
$$P(x) = \begin{cases} 1/6 & \text{when } x=0 \\ 2/3 & \text{when } x=1 \\ 1/6 & \text{when } x=2 \\ 0 & \text{otherwise} \end{cases}$$

Find-

  - (i)  $p(x=0)$
  - (ii)  $p(x=1)$
  - (iii)  $p(x \text{ is even})$
  - (iv)  $p(x \text{ is multiple of } 5)$
  - (v)  $p(x > 0)$
2. Find the mean and variance of the following random variables X whose probability distribution function P(x) is given by
 

x	:	-1	0	1
P(x)	:	0.4	0.35	0.25
3. Calculate first four raw moments about origin and first central moments for X denoting No of heads in three tosses of an unbiased coin. (5)

Q3. Attempt any 2 from the following.

1. A discrete random variable x has PMF given by (5)
 

x	P(x)
-1	0.1
0	0.2
1	0.3
2	0.4

- (i) Examine whether  $x$  and  $y$  are stochastically independent
- (ii)  $Y$  and  $Z$  are stochastically independent

2. The percentage of defective bolts manufactured by a firm is known to be 10%. If a packet of 5 blades produced by this firm is selected at random, determine the probability that there are exactly two defectives in this packet? (5)
3. It is known that on an average three accidents take place in the busy streets of Mumbai every day. Find the probability that (i) no accident (ii) one accident will take place tomorrow. (5)

**Q4. Attempt any 2 from the following**

1. Two cards are drawn from a full pack of 52 cards. What is the chance that they are (i) both kings (ii) both spades (iii) one spade and one heart? (5)
2. A Binomial distribution has mean 6 and variance 3. Find  $n$  and  $p$ . (5)
3. A discrete random variable  $X$  has mean 10 and standard deviation 2. Obtain the value of
  - (i)  $E(5-x)$
  - (ii)  $E(aX+7)$  where  $a$  is a constant
  - (iii)  $V(2X-3)$
  - (iv)  $V(7-x)$