

Xy9ABI

Marks : 40

Time : 2 Hours

- N.B.** 1. All questions are compulsory.  
2. Attempt any two sub-questions out of three sub-questions  
3. Figures to the right indicate full marks.  
4. Use of non-programmable scientific calculator is allowed.

**Q1** Attempt any TWO questions from the following:

1. A committee of 3 is to be formed from among 5 boys and 3 girls. What is the probability that the committee shall have? (5)
  - (i) no boys
  - (ii) 2 boys and 1 girl
  - (iii) At least one boy
  - (iv) More girls than the number of boys.
2. One card is randomly drawn from a standard pack of 52 (5)
  - (i) What is the chance that it is either a king or a queen?
  - (ii) Find the probability that it is either a diamond or a king.
  - (iii) What is the probability that the card is either a jack or a queen?
3. A large box contains 30 colored balls of which 15 are red, 10 are white and the rest are black. One ball is drawn at random. Find the probability of drawing (5)
  - (i) a red ball
  - (ii) a white ball
  - (iii) a black ball
  - (iv) a white or black ball.

**Q2** Attempt any TWO questions from the following:

1. The probability mass function of random variable 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)  $P(x \text{ is multiple of } 5)$
2. Following are the observed value of discrete random variable X and Y. (3,7) (2,4) (2,6) (3,5) (4,7) (2,4) (3,5) (4,7) (3,4) (3,6) write down (i) joint probability mass function of x and y (ii) marginal probability mass function of x and y (iii) conditional probability mass function of y when  $x > 3$ . (5)

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3. X and y are two random variables with  $E(X)=5$ ,  $V(X)=2$ ,  $E(Y)=12$ ,  $V(Y)=3$  (5)  
Find (i)  $E(X+Y)$  (ii)  $E(2X+3Y)$  (ii)  $V(X+Y)$

**Q3 Attempt any TWO questions from the following:**

1. It is observed that 30% of the students in the class are swimmers. If 3 students are selected at random from this class, what is the chance that only one of them is a swimmer? (5)
2. A has won 20 out of 30 games of chess with B. In a new series of 6 games, what is the probability that A would win (i) four or more games (ii) only four games? (5)
3. A variate X follows Poisson distribution with variance 3. What is the probability that (i)  $X=0$  (ii)  $x>1$ ? Given that  $e^{-1.5}=0.223$ ,  $e^{-3}=0.05$ . (5)

**Q4 Attempt any TWO questions from the following:**

1. A card is drawn from a full pack. In relation to the possible outcomes; form in each of the following four cases; events A,B,C so that they are : (5)  
(i) Exhaustive  
(ii) Mutually exclusive  
(iii) Mutually exclusive and exhaustive  
(iv) Mutually exclusive but not exhaustive
2. A Binomial distribution has mean 6 and variance 3. Find n and p. (5)
3. In the following case, determine whether p(x) can be regarded as probability distribution function: (5)
- |        |     |      |     |
|--------|-----|------|-----|
| x :    | -1  | 0    | 1   |
| p(x) : | 1/7 | 3/11 | 4/7 |

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