Model Question Paper

Probability Distributions - Part II

12th Standard

Maths

Reg.No. : | | | | | | |

I.Answer all the Questions.

II.Use Blue pen only.

Time : 01:00:00 Hrs

Total Marks : 70

Section-A

5 x 1 = 5

1) X is a random variable taking the values 3,4 and 12 with probabilities 1/3, 1/4 and 5 / 12 . Then E(X) is.

(a) 5 (b) 6 (c) 7 (d) 3

2) Variance of the random variable X is 4. Its mean is 2 . Then $E(X^2)$ is

(a) 2 (b) 4 (c) 6 (d) 8

3) $\mu_2 = 20 \quad , \quad \mu'_2 = 276$ for a discrete random variable X. Then the mean of the random variable X is.

(a) 16 (b) 5 (c) 2 (d) 1

4) Var (4X+ 3) is.

(a) 7 (b) 16 Var (X) (c) 19 (d) 0

5) In 5 throws of a die, getting 1 or 2 is a success. The mean number of successes is

(a) 5/3 (b) 3/5 (c) 5/9 (d) 9/5

Section-B

5 x 3 = 15

6) The difference between the mean and the variance of a Binomial distribution is 1 and the difference between their squares is 11. Find n.

7) The mean of a binomial distribution is 6 and its standard deviation is 3. Is this statement true or false? Comment.

8) A die is thrown 120 times ad getting 1 or 5 is considered a success. Find the mean and variance of the number of successes.

Section-C

3 x 6 = 18

9) For the p.d.f $f(x) = \begin{cases} cx(1-x)^3, & 0 < x < 1 \\ 0 & elsewhere \end{cases}$ find

(i) the constant C

(ii) $P\left(x < \frac{1}{2}\right)$

10) For the distribution function given by $F(x) = \begin{cases} 0 & x < 0 \\ x^2 & 0 \le x \le 1 \\ 1 & x > 1 \end{cases}$ Find the density function.

11) Two unbiased dice are thrown together at random. Find the expected value of the total number of points shown up

12) a) If on an average 1 ship out of 10 do not arrive safely to ports. Find the mean and the standard deviation of ships returning safely out of a total of 500 ships.

b) In a hurdle race a player has to cross 10 hurdles. The probability that he will clear each hurdle is 5 / 6. What is the probability that he will knock down less than 2 hurdles.

Section-D

3 x 10 = 30

13) A random variable X has the following probability mass function

X	0	1	2	3	4	5	6
P (X = x)	k	3k	5k	7k	9k	11k	13k

(1) Find k. (2) Evaluate $P(X < 4), P(X \ge 5), P(3 < X \le 6)$ (3) What is the smallest value of x for which $P(X \le x >) \frac{1}{2}$?

14) An urn contains 4 white and 3 red balls. Find the probability distribution of number of red balls in three draws one by one from the urn. (i) With replacement (ii) without replacement

15) The total life time (in year) of 5 year old dog of a certain breed is a Random Variable whose distribution function is given by $\begin{cases} 0 & for\ x \le 5 \\ 1 - \frac{25}{x^2} & for\ x > 5 \end{cases}$ Find the probability that such a five year old dog will live (i) beyond 10 years (ii) less than 8 years (iii) anywhere between 12 to 15 years.

****