

Model Question Paper
Probability Distributions - Part I

12th Standard

Maths

Reg.No. :

I. Answer all the Questions.

II. Use Blue pen only.

Time : 01:00:00 Hrs

Total Marks : 68

5 x 1 = 5

Section-A

- 1) If $f(x) = \begin{cases} kx^2 & , 0 < x < 3 \\ 0 & , elsewhere \end{cases}$ is a probability density function then the value of k is.

(a) 1/3 (b) 1/6 (c) 1/9 (d) 1/12

- 2) A random variable X has the following probability distribution

X	0	1	2	3	4	5
P(X=x)	1/4	2a	3a	4a	5a	1/4

Then $P(1 \leq x \leq 4)$ is...

(a) 10/21 (b) 2/7 (c) 1/14 (d) 1/2

- 3) A random variable X has the following probability mass function as follows

x	-2	3	1
P(X=x)	$\lambda/6$	$\lambda/4$	$\lambda/12$

(a) 1 (b) 2 (c) 3 (d) 4

- 4) X is a discrete random variable which takes the values 0,1,2 and $P(X=0) = 144/169$, $P(X=1) = 1/169$ then the value of $P(X=2)$ is.

(a) 145/169 (b) 24/169 (c) 2/169 (d) 143/169

- 5) A random variable X has the following p.d.f.

x	0	1	2	3	4	5	6	7
P(X=x)	0	k	2k	2k	3k	k^2	$2k^2$	$7k^2 + k$

(a) 1/8 (b) 1/10 (c) 0 (d) -1 or 1/10

Section-B

5 x 3 = 15

- 6) A continuous random variable x has the p.d.f defined by $f(x) = \begin{cases} ce^{-ax} & , 0 < x < \infty \\ 0 & , elsewhere \end{cases}$ Find the value of c if $a > 0$.

- 7) In a Binomial distribution if $n = 5$ and $P(x = 3) = 2P(x = 2)$ find p.

- 8) If the sum of mean and variance of a Binomial Distribution is 4.8 for 5 trials find the distribution.

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

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

Section-C

3 x 6 = 18

- 11) Find the probability distribution of the number of sixes in throwing three dice once.

- 12) Two cards are drawn successively without replacement from a well shuffled pack of 52 cards. Find the probability distribution of the number of queens

- 13) Two bad oranges are accidentally mixed with ten good ones. Three oranges are drawn at random without replacement from this lot. Obtain the probability distribution for the number of bad oranges

Section-D

3 x 10 = 30

- 14) The number of accidents in a year involving taxi drivers in a city follows a Poisson distribution with mean equal to 3. Out of 1000 taxi drivers find approximately the number of drivers with (i) no accident in a year (ii) more than 3 accidents in a year $[e^{-3} = 0.0498]$

- 15) a) The mean score of 1000 students for an examination is 34 and S.D. is 16. (i) How many candidates can be expected to obtain marks between 30 and 60 assuming the normally of the distribution and (ii) determine the limit of the marks of the central 70% of the candidates.

(OR)

- b) Obtain k , μ and σ^2 of the normal distribution whose probability distribution function is given by $f(x) = ke^{-2x^2+4x}$ $-\infty < x < \infty$
