

Model Question Paper
Probability Distributions - Part III
12th Standard

Maths

Reg.No. :

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I. Answer all the Questions.
II. Use Blue pen only.

Time : 01:00:00 Hrs

Total Marks : 75

3 x 1 = 3

Section-A

- 1) A discrete random variable takes
(a) only a finite number of values (b) all possible values between certain given limits (c) infinite number of values (d) a finite or countable number of values
- 2) A continuous random variable takes
(a) only a finite number of values (b) all possible values between certain given limits (c) infinite number of values (d) a finite or countable number of values
- 3) If X is a discrete random variable then $P(X \geq a) =$
(a) $P(X < a)$ (b) $1 - P(X \leq a)$ (c) $1 - P(X < a)$ (d) 0

Section-B

5 x 3 = 15

- 4) Let X have a Poisson distribution with mean 4. Find $P(2 \leq X < 5)$ [$e^{-4} = 0.0183$]
- 5) If Z is a standard normal variate, find the value of c for the following $\backslash P(0$
- 6) If Z is a standard normal variate, find the value of c for the following $\backslash P(-c$
- 7) If X is a normal variate with mean 80 and standard deviation 10, compute the following probabilities by standardizing.
 $P(X \leq 100)$
- 8) If X is a normal variate with mean 80 and standard deviation 10, compute the following probabilities by standardizing.
 $P(70 < X)$

Section-C

4 x 6 = 24

- 9) Two cards are drawn with replacement from a well shuffled deck of 52 cards. Find the mean and variance for the number of aces.
- 10) In a gambling game a man wins Rs. 10 if he gets all heads or all tails and loses Rs. 5 if he gets 1 or 2 heads when 3 coins are tossed once. Find his expectation of gain
- 11) The probability distribution of a random variable X is given below:

X	0	1	2	3
p(X=x)	0.1	0.3	0.5	0.1

If $Y = X^2 + 2X$ find the mean and variance of Y.

- 12) A pair of dice is thrown 10 times. If getting a doublet is considered a success find the probability of No success.

Section-D

4 x 10 = 40

- 13) The probability density function of a random variable X is $f(x) = \begin{cases} kx^{\alpha-1} e^{-\beta x} & , x, \alpha, \beta > 0 \\ 0, & elsewhere \end{cases}$ (i) Find k (ii) Find $P(X > 10)$
- 14) If the number of incoming buses per minute at a bus terminus is a random variable having a Poisson distribution with $\lambda = 0.9$ find the probability that there will be (i) Exactly 9 incoming buses during a period of 5 minutes. (ii) Fewer than 10 incoming buses during a period of 8 minutes. (iii) At least 14 incoming buses during a period of 11 minutes.
- 15) a) If X is normally distributed with mean 6 and standard deviation 5 find. (i) $P(1 \leq x \leq 8)$ (ii) $P(|X-6| < 10)$

(OR)

- b) The air pressure in a randomly selected tyre put on a certain model new car is normally distributed with mean value 31 psi and standard deviation 0.2 psi. What is the probability that the pressure for a randomly selected tyre
(a) between 30.5 and 31.5 psi (b) between 30 and 32 psi
