

Model Question Paper
Probability Distributions - Part IV

12th Standard

Maths

Reg.No. :

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I. Answer All the Question

II. Use Blue pen Only.

Time : 01:00:00 Hrs

Total Marks : 70

3 x 1 = 3

Section-A

- 1) Mean and variance of binomial distribution are
(a) nq, npq (b) $np, \sqrt{npq}$ (c) np, np (d) np, npq
- 2) Which of the following is or are correct regarding normal distribution curve?
i) Symmetrical about the line $X = \mu$ (mean)
ii) Mean = median = mode
iii) Unimodal
iv) Point of inflection are at $X = \mu \pm \sigma$
(a) (i), (ii) only (b) (ii), (iv) only (c) (i), (ii), (iii) only (d) all
- 3) For a standard normal distribution the mean and variance are
(a) μ, σ^2 (b) μ, σ (c) 0, 1 (d) 1, 1

Section-B

6 x 3 = 18

- 4) Prove that the total probability is one.
- 5) If the probability of a defective fuse from a manufacturing unit is 2% in a box of 200 fuses find the probability that more than 3 fuses are defective $[e^{-4} = 0.0183]$
- 6) Let Z be a standard normal variate. Find the value of c in the following problems. $P(Z > c) = 0.05$
- 7) Find the Mean and Variance for the following probability density functions: $f(x) = \begin{cases} xe^{-x} & , \text{if } x > 0 \\ 0 & , \text{otherwise} \end{cases}$
- 8) Verify that following are probability density functions. $f(x) = \frac{1}{\pi} \frac{1}{(1+x^2)}, -\infty$
- 9) Let Z be a standard normal variate. Calculate the following probabilities. $P(0 \leq Z \leq 1.2)$

Section-C

7 x 6 = 42

- 10) Find the mean and variance of the distribution $f(x) = \begin{cases} 3e^{-3x}, & 0 < x < \infty \\ 0 & , \text{otherwise} \end{cases}$
- 11) In an entrance examination a student has to answer all the 120 questions. Each question has four options and only one option is correct. A student gets 1 mark for a correct answer and loses half mark for a wrong answer. What is the expectation of the mark scored by a student if he chooses the answer to each question at random
- 12) Two cards are drawn with replacement from a well shuffled deck of 52 cards. Find the mean and variance for the number of aces.
- 13) 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
- 14) 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.

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

(OR)

- b) Four coins are tossed simultaneously. What is the probability of getting (a) exactly 2 heads (b) at least two heads (c) at most two heads.
