

8. BINOMIAL DISTRIBUTION

Q.1) Multiple Choice Questions (M.C.Q)

2m

1. In a Binomial distribution with $n = 4$, if $2 P(X=3) = 3 P(X =2)$, then value of p is

- a) $\frac{9}{13}$ b) $\frac{4}{13}$ c) $\frac{6}{13}$ d) $\frac{7}{13}$

2. Given that $X \sim B(n, P)$. If $n = 10$, $P = 0.4$ then $E(X) = \dots\dots\dots$

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

3. For $X \sim B(n, P)$, If $v(x) = 2.4$ and $P = 0.4$ then $n = \dots\dots\dots$

- a) 10 b) 20 c) 30 d) 40

4. Given that $X \sim B(n = 10, P)$, $E(X) = 8$ then value of $P = \dots\dots\dots$

- a) 0.4 b) 0.8 c) 0.6 d) 0.7

5. Bernoulli distribution is a particular case of binomial distribution if $n = \dots\dots\dots$

- a) 4 b) 10 c) 2 d) 1

II. Very Short Answers (1 mark)

i) If $X \sim B(n,P)$, $E(X) = 12$, $V(X) = 4$ then find n

ii) For Bernoulli Distribution, state formula for $E(X)$ and $V(X)$

iii) For $X \sim B(n, P)$ and $P(X=x) = {}^n C_x (1/2)^x (1/2)^{3-x}$ then state values of n and P

iv) State the formula for p.m.f of Binomial Distribution.

v) A die is thrown. If X denotes the number of positive divisor of the outcomes then find the range of random variable X .

III. Short Answers (2 marks)

i) A r.v $X \sim B(n,P)$. If the value of mean and variance of X are 18 and 12 respectively then find total number of positive value of X .

ii) Given $X \sim B(n,P)$, If $E(X) = 6$, $V(X) = 4.2$ find n and P

iii) If $X \sim B(n, P)$ with $n = 10$, $P = 0.4$ then find $E(X^2)$

iv) If $X \sim B(6, P)$ and $2. P(X=3) = P(X=2)$ then find P .

v) Let the p.m.f of r.v.x be $p(x) = {}^4 C_x \left(\frac{5}{9}\right)^x \left(\frac{4}{9}\right)^{4-x}$, $x=0,1,2,4$ Find $E(X)$ and $\text{Var}(X)$

IV. Short answers (3 Marks)

i) A Fair coin is tossed 5 times , find the probability that a) coin shows exactly three times head b) no head.

ii) The probability that certain kind of component will survive a check test is 0.6. Find the probability that exactly 2 of the next 4 tested components survive.

iii) Find the probability of guessing correctly at least nine out of ten answers in a "true" or "false" objective test.

iv) A fair coin is tossed 8 times. Find the probability that it shows heads i) exactly 5 times ii) at least once.

v) The Probability that a person who undergoes a kidney operation will be recovered is 0.5. find the probability that out of 6 patients who undergo similar operation a) none will recover b) half of them recover.