

## Chapter-16

# Probability Distribution

### MTP October, '19

- Find the probability that at least 5 defective bolts will be found in a box of 200 bolts. If it is known that 2% of such bolts are expected to be defective (Given:  $e^{-4} = 0.0183$ )  
(a) 0.4717                      (b) 0.3717                      (c) 0.3017                      (d) None of these
- If the two quartiles of a normal distribution are 47.30 and 52.70 respectively, find the mean deviation about median of this distribution.  
(a) 3.80                      (b) 3.40                      (c) 3.20                      (d) 4.20

### MTP March, '20

- X follows normal distribution with mean as 50 and variance as 100. What is  $P(x \geq 60)$ ? [Given  $\phi(1) = 0.8413$ ]  
(a) 0.20                      (b) 0.40                      (c) 0.16                      (d) 0.30
- Number of misprints per page of a thick book follows  
(a) Normal distribution                      (b) Poisson distribution  
(c) Binomial distribution                      (d) Standard normal distribution
- If for a Poisson variable X,  $f(2) = 3 f(4)$ , what is the variance of X?  
(a) 2                      (b) 4                      (c)  $\sqrt{2}$                       (d) 3
- If the points of inflexion of a normal curve are 40 and 60 respectively, then its mean deviation is  
[MTP April '19, March '19]  
(a) 8                      (b) 10                      (c) 12                      (d) 15

### MTP October, '19

- If x & y are two independent variables such that  $x \sim B(n_1, P)$  and  $y \sim B(n_2, P)$  then the parameter of  $Z = x+y$  is  
(a)  $(n_1+n_2), P$                       (b)  $(n_1-n_2), P$   
(c)  $(n_1+n_2), 2P$                       (d) None of these
- Five coins tossed 3200 times. The number of times 5 heads appeared is  
(a) 500                      (b) 1200                      (c) 200                      (d) 100
- For the normal distribution density function  $f(x) = k.e^{-\frac{(x^2 - 6x + 9)}{8}}$ , the mean and variance are  
(a) (2,3)                      (b) (3,2)                      (c) (4,3)                      (d) (3,4)

10. The mean deviation of normal distribution is 16. The Quartile Deviation is  
 (a)  $40/3$  (b)  $20/3$  (c)  $100/3$  (d)  $50/3$
11. The Quartile Deviation of the normal distribution  $f(x) = \frac{1}{\sqrt{18\pi}} e^{-\frac{(x-10)^2}{18}}$ ,  $-\infty < X < \infty$   
 (a) 3 (b)  $4/3$  (c) 2 (d)  $3/4$
12. If x and y are two independent normal random distributions with mean and SD's are (10, 5) and (15, 12) these mean and SD of (x+y) is  
 (a) (27, 15) (b) (10, 27) (c) (25, 13) (d) (12, 25)

**MTP April, '19**

13. A binomial distribution is  
 (a) never symmetrical (b) never positively skewed  
 (c) never negatively skewed (d) symmetrical when  $p = 0.5$
14. The maximum value of the variance of a binomial distribution with parameters n and p is  
 (a)  $n/2$  (b)  $n/4$  (c)  $np(1-p)$  (d)  $2n$
15. Which one is uniparametric distribution?  
 (a) Binomial (b) Poisson (c) Normal  
 (d) Hyper geometric
16. The mean deviation about median of a standard normal variate is  
 (a)  $0.675 \sigma$  (b) 0.675 (c)  $0.80 \sigma$  (d) 0.80
17. What is the first quartile of X having the following probability density function?  $f(x) = \frac{1}{\sqrt{72\pi}} e^{-\frac{(x-10)^2}{72}}$  for  $-\infty < x < \infty$   
 (a) 4 (b) 5 (c) 5.95 (d) 6.75

**MTP March, '19**

18. The total area of the normal curve is  
 (a) one. (b) 50 per cent. (c) 0.50. (d) any value between 0 and 1. **[MTP Oct. '20]**
19. The interval  $(\mu - 3\sigma, \mu + 3\sigma)$  covers  
 (a) 95% area of a normal distribution. (b) 96% area of a normal distribution.  
 (c) 99% area of a normal distribution. (d) all but 0.27% area of a normal distribution.
20. If the mean deviation of a normal variable is 16, what is its quartile deviation?  
 (a) 10.00 (b) 13.50 (c) 15.00 (d) 12.05
21. For Poisson fitting to an observed frequency distribution  
 (a) we equate the Poisson parameter to the mean of the frequency distribution.  
 (b) we equate the Poisson parameter to the median of the distribution.  
 (c) we equate the Poisson parameter to the mode of the distribution.  
 (d) none of these.

**MTP Oct '20**

22. The Binomial Distribution for which mean = 15 and variance = 6.0 is  
(a)  ${}^{25}C_x (3/5)^x (2/5)^{25-x}$  (b)  ${}^{25}C_x (2/5)^x (3/5)^{25-x}$   
(c)  ${}^{25}C_x (2/5)^x (3/5)^{1-x}$  (d)  ${}^{25}C_x (3/5)^x (2/5)^{1-x}$
23. The SD of a binomial distribution with parameter n and p is  
(a)  $n(1-p)$  (b)  $np(1-p)$  (c)  $np$  (d)  $\sqrt{np(1-p)}$
24. If  $P(X=2) = P(X=3)$  for a Poisson Variate X, then  $E(x)$  is  
(a) 2 (b) 3 (c) 1 (d) none
25. The mean and mode of the normal distribution  
(a) may be equal (b) may be different (c) are always equal (d) (a) or (b)

**MTP March '21**

26. In normal distribution what is the ratio of QD:MD:SD  
(a) 12:10:15 (b) 15:10:12 (c) 10:15:12 (d) 10:12:15
27. Area covered normal curve by  $\mu \pm 3\sigma$   
(a) 68.28% (b) 95.96% (c) 99.73% (d) 99.23%
28. If x is binomial variate with parameter 15 and  $1/3$  what is the value of mode of the distribution.  
(a) 5 & 6 (b) 5.5 (c) 5 (d) 6
29. In Poisson distribution which of the following is same.  
(a) Mean and variance. (b) Mean and SD  
(c) Both (d) None of these
30. The Quartile Deviation of Normal Distribution with mean is 10 and variance is 16 is  
(a) 54.24 (b) 23.20 (c) 0.275 (d) 2.70
31. What is the standard deviation of number recoveries among 48 patients when the probability of recovering is 0.75 ?  
(a) 36 (b) 81 (c) 9 (d) 3

**MTP-March'22**

32. The mode of the binomial distribution for which the mean is 4 variance 3 is equal to ?  
(a) 4 (b) 4.5 (c) 4.25 (d) 4.1
33. For Poisson Distribution :  
(a) Mean and Standard Deviation are equal (b) Mean and Variance are equal  
(c) Standard Deviation and Variance are equal (d) Both (a) and (b) are equal
34. If a variate x has, mean > variance, then the distribution will be \_\_\_\_  
(a) Binomial Distribution (b) Poisson Distribution  
(c) Normal Distribution (d) T-Distribution

35. An example of a bi-parametric continuous probability distribution  
 (a) Binomial (b) Poisson (c) Normal (d) Chi-square
36. For a poisson variate X,  $P(x=2) = 3 P(x=4)$ , then the standard deviation of X is  
 (a) 2 (b) 4 (c)  $\sqrt{2}$  (d) 3
37. What is the mean of X having the following density function ?

$$f(x) = \frac{1}{4\sqrt{2}\pi} e^{-\frac{(x-10)^2}{32}} \text{ for } -\infty < x < \infty$$

- (a) 10 (b) 4 (c) 40 (d) none of these

**MTP-Oct'21**

38. What is the first quartile of X having the following probability density function?

$$f(x) = \frac{1}{\sqrt{72}\pi} e^{-\frac{(x-10)^2}{72}} \text{ for } -\infty < x < \infty$$

- (a) 4 (b) 5 (c) 5.95 (d) 6.75

39. If X follows normal distribution with  $\mu = 50$  and  $\sigma = 10$ , what is the value of

$$P(x \leq 60 / x > 50)?$$

- (a) 0.8413 (b) 0.6826 (c) 0.1587 (d) 0.7256

$$\Phi(1) = 0.8413$$

40. For a normal distribution with mean as 500 and SD as 120, what is the value of k so that the interval [500, k] covers 40.32 per cent area of the normal curve? [Given  $\Phi(1.30) = 0.9032$ .]

- (a) 740 (b) 750 (c) 656 (d) 800

41. If the mean deviation of a normal variable is 16, what is its quartile deviation?

- (a) 10.00. (b) 13.50. (c) 15.00. (d) 12.05.

42. For a Poisson variate X,  $P(X = 1) = P(X = 2)$ . What is the mean of X?

- (a) 1.00. (b) 1.50. (c) 2.00. (d) 2.50.

43. The variance of a binomial distribution with parameters n and p is

- (a)  $np^2(1-p)$  (b)  $\sqrt{np(1-p)}$  (c)  $nq(1-q)$  (d)  $n^2p^2(1-p)^2$

**MTP-Nov'21**

44. Number of defects in clothes a garments showroom will form a

- (a) Poisson distribution (b) Normal distribution  
 (c) Binomial distribution (d) Cannot be determined

Probability distribution may be

- (a) Discrete (b) Continuous (c) Infinite (d) (a) or (b)

In a certain Poisson frequency distribution, the probability corresponding to two success is half the probability corresponding to three successes. The mean of the distribution is

- (a) 6 (b) 12 (c) 3 (d) 2.45

The normal curve is

- (a) Positively skewed (b) Negatively skewed  
(c) Symmetrical (d) All these

An example of a bi-parametric discrete Probability distribution is

- (a) Binomial distribution (b) Poisson Distribution  
(c) Normal Distribution (d) Both (a) and (b)

For a normal distribution  $Q_1 = 54.32$  and  $Q_3 = 78.86$ , then the median of the distribution is

- (a) 12.17 (b) 39.43 (c) 66.59 (d) None

**MTP-2 Nov'22**

What is the mean of X having the following density function?

$$f(x) = \frac{1}{\sqrt[4]{2\pi}} e^{-\frac{(x-10)^2}{32}} \text{ for } -\infty < x < \infty$$

- (a) 4 (b) 10 (c) 40 (d) None of these

If mean and variance are 5 and 3 respectively then relation between p and q is :

- (a)  $p > q$  (b)  $p < q$  (c)  $p = q$  (d) p is symmetric

In a Poisson distribution if  $P(x=4) = P(x=5)$  then the parameter of Poisson distribution is:

- (a)  $4/5$  (b)  $5/4$  (c) 4 (d) 5

Area between -1.96 to +1.96 in a normal distribution is :

- (a) 95.45% (b) 95% (c) 96% (d) 99%

**MTP-1 Nov'22**

The probability of a man hitting the target is  $1/4$ . If he fires 7 times, the probability of hitting the target at least twice is :

- (a)  $1 - \left(\frac{5}{2}\right)\left(\frac{3}{4}\right)^6$  (b)  $1 - \frac{15}{2}\left(\frac{3}{4}\right)^6$  (c)  $1 - \frac{5}{6}, 3^5$  (d)  $1 - \left(\frac{3}{4}\right)^6$

If 5% of the electric bulbs manufactured by a company are defective, use Poisson distribution to find the probability that in a sample of 100 bulbs, 5 bulbs will be defective. [Given :  $e^{-5} = 0.007$ ]

- (a) 0.1823 (b) 0.1723 (c) 0.1623 (d) 0.1923

Examine the validity of the following : Mean and standard deviation of a binomial distribution are 10 and 4 respective:

- (a) Not valid (b) Valid  
(c) Both [a] and [b] (d) Neither [a] nor [b]

57. For a Poisson variate  $X$ ,  $P(x=1) = P(x=2)$ , what is the mean of  $x$ ?  
 (a) 1 (b)  $3/2$  (c) 2 (d)  $5/2$
58. For a normal distribution, the first and third quartile are given to be 37 and 49, the mode of the distribution is.  
 (a) 37 (b) 49 (c) 43 (d) 45

**MTP-2 June'22**

59. If  $x$  be a poisson variates with parameter 1; then find  $P(3 < X < 5)$ . (Given  $e^{-1} = 0.36783$ )  
 (a) 0.015326 (b) 0.15326 (c) 0.012326 (d) None of these
60. The probability that a student is not a swimmer is  $1/5$ , then the probability that out of five students four are swimmers is:  
 (a)  $\left(\frac{4}{5}\right)^4 \left(\frac{1}{5}\right)$  (b)  ${}^5C_1 \left(\frac{1}{5}\right)^4 \left(\frac{4}{5}\right)$  (c)  ${}^5C_4 \left(\frac{4}{5}\right)^4 \left(\frac{1}{5}\right)$   
 (d) None of these
61. In a Binomial distribution  $n = 9$  and  $P = 1/3$ . What is the value of Variance.  
 (a) 8 (b) 4 (c) 2 (d) 16
62. The variance of standard normal distribution is  
 (a) 1 (b) 0 (c)  $\sigma^2$  (d) 0
63. In a Poisson Distribution  $P(x=0) = P(x=2)$ . Find  $E(x)$   
 (a)  $\sqrt{2}$  (b) 2 (c) -1 (d) 0
64. Name of the distribution which has Mean = Variance  
 (a) Binomial (b) Poisson (c) Normal (d) (a) and (b)

**ANSWER KEYS**

1	(b)	2	(c)	3	(c)	4	(b)
5	(a)	6	(a)	7	(a)	8	(d)
9	(d)	10	(a)	11	(c)	12	(c)
13	(d)	14	(b)	15	(b)	16	(d)
17	(c)	18	(a)	19	(d)	20	(b)
21	(a)	22	(a)	23	(d)	24	(b)
25	(c)	26	(d)	27	(c)	28	(c)

29	(a)	30	(d)	31	(d)	32	(a)
33	(b)	34	(a)	35	(c)	36	(c)
37	(a)	38	(c)	39	(b)	40	(c)
41	(b)	42	(c)	43	(c)	44	(a)
45	(d)	46	(a)	47	(c)	48	(a)
49	(c)	50	(b)	51	(b)	52	(d)
53	(b)	54	(a)	55	(a)	56	(a)
57	(c)	58	(c)	59	(a)	60	(c)
61	(c)	62	(a)	63	(a)	64	(b)