Multiple Choice Questions

[MHT-CET 2022] (online - shift)

1. Following is the probability distribution of smart phones sold in shop per day :

No. of smart phones	0	1	2	3	4	5
Probability	K	0.3	0.15	0.15	0.1	2K

then E (x) =

a) 2.45 b) 0.75 c) 0.55 d) 2.55

2. A random variable x assumes values 1, 2, 3, ... n with equal probabilities. If the ratio of variance of x to expected value of x is equal to 4, then the value of n is

a) 50 b) 30 c) 25 d) 35

3. Two numbers are selected at random from the first six positive integers. If x denotes the larger of two numbers, then Var (x) =

a) $\frac{1}{3}$ b) $\frac{70}{3}$ c) $\frac{14}{9}$ d) $\frac{14}{3}$

4. A random variable x has following probability distribution

x	0	1	2	3	4	5	6
P (x)	K	3 K	5 K	7 K	9 K	11 K	13 K

then P $(x \geq 2)$

a) $\frac{1}{49}$ b) $\frac{45}{49}$ c) $\frac{40}{49}$ d) $\frac{15}{49}$

5. A player tosses 2 fair coins. He wins ₹ 5 if 2 heads appear, ₹ 2 if 1 head appears and ₹ 1 if no heads appear, then the variance of his winning amount is

a) $\frac{17}{2}$ b) $\frac{9}{4}$ c) 6 d) $\frac{5}{2}$

6. If the function P $[x = x] = \begin{cases} \frac{K.2^x}{x!}, & x = 0,1,2,3..... \\ 0 & \text{otherwise} \end{cases}$ forms $p.m.f.$ then value of K is

a) $\frac{1}{19}$ b) $\frac{3}{19}$ c) $\frac{2}{19}$ d) $\frac{5}{19}$

7. In pizzahut, the following distribution is found for daily demand

No. of pizzas	5	6	7	8	9	10
Probability	0.07	0.2	0.3	0.3	0.07	0.06

Then expected daily demand and variance are respectively.

a) 7.28 and 1.52 b) 1.52 and 7.28 c) 7.28 and 54.52 d) 7.28 and 53

8. A random variable x has following probability distribution

x	8	12	16	20	2 K
P (x)	K	$\frac{1}{6}$	$\frac{3}{8}$	2 K	$\frac{1}{12}$

Then the value of K is

a) $\frac{1}{8}$ b) $\frac{3}{2}$ c) $\frac{1}{2}$ d) $\frac{1}{4}$

15. In a meeting 60 % of the members favour and 40 % oppose a certain proposal. A member is selected at random and we take X = 0 if he opposed and X = 1, if he is in favour, then Var X = ...

a) 0.36 b) 0.24 c) 0.6 d) 0.06

16. If X is a random variable with p.m.f. as follows

$$P(X = x) = \frac{5}{16}, \quad x = 0, 1$$

$$= \frac{kx}{48}, \quad x = 2$$

$$= \frac{1}{4}, \quad x = 3$$

then E (x) = ...

a) 1.1875 b) 1.3125 c) 1.5625 d) 0.5625

17. A bakerman sells 5 types of cakes. Profit due to sale of each type of cake is respectively ₹ 2, ₹ 2.5, ₹ 3, ₹ 1.5, and ₹ 1. The demands of these cakes are 20%, 5%, 10%, 50% and 15% respectively, then the expected profit per cake is

a) ₹ 1.725 b) ₹ 0.01725 c) ₹ 0.1725 d) ₹ 17.25

18. A random variable X has following distribution.

x = x	1	2	3	4	5	6
P[x = x]	K	3 K	5 K	7 K	8 K	K

Then P ($2 \leq x < 5$)

a) $\frac{7}{25}$ b) $\frac{3}{5}$ c) $\frac{24}{25}$ d) $\frac{23}{25}$

19. A coin is tossed three times. If x denotes the absolute difference between the number of heads and the number of tails, then P (x = 1) = ...

a) $\frac{1}{6}$ b) $\frac{1}{2}$ c) $\frac{2}{3}$ d) $\frac{3}{4}$

20. The distribution function F(x) of d.r.v. x is given by

x	1	2	3	4	5	6
F[x = x]	0.2	0.37	0.48	0.62	0.85	1

Then P [x = 4] + P [x = 5] =

a) 0.14 b) 0.85 c) 0.37 d) 0.23

[MHT-CET 2020]

21. A random variable x takes the values 0, 1, 2. Its mean is 1.2. If P(x = 0) = 0.3 then P (x = 1) =

a) 0.5 b) 0.2 c) 0.1 d) 0.4

22. The c.d.f (x) of d.r.v. x is given by

x	– 3	– 1	0	1	3	5	7	9
F (x)	0.1	0.3	0.5	0.65	0.75	0.85	0.90	1

Then P [x = 3] = ...

a) 0.75 b) 0.10 c) 0.85 d) 0.65

23. The c.d.f F(x) associated with p.d.f $f(x) = 3(1-2x^2)$ if $0 < x < 1$
$= 0$ otherwise
is $K\left(x - \frac{2x^3}{K}\right)$, then value of K is

a) $\frac{1}{3}$ b) $\frac{1}{6}$ c) 1 d) 3

24. If the probability density function of a continuous random variable is

$f(x) = \frac{x^3}{3}$ if $-1 < x < 2$

$= 0$ otherwise

Then the cumulative distribution function of x is

a) $\frac{1}{14}(x^4-1)$ b) $\frac{1}{16}[x^4-1]$ c) $\frac{1}{12}[x^4-1]$ d) $\frac{1}{10}[x^4-1]$

25. The p.d.f. of random variable x is given by $f(x) = \frac{K}{\sqrt{x}}$, if $0 \leq x \leq 4$
$= 0$ otherwise

Then P $(1 < x < 4)$ = ...

a) $\frac{3}{4}$ b) $\frac{1}{5}$ c) $\frac{1}{2}$ d) $\frac{1}{3}$

26. The cumulative distribution function of a continuous random variable x is given by

$F(x = x) = \frac{\sqrt{x}}{2}$, then P $[x > 1]$ is

a) $\frac{1}{2}$ b) $\frac{1}{\sqrt{2}}$ c) $\frac{1}{4}$ d) $\frac{1}{3}$

27. If the error involved in making a certain measurement is continuous random variable x with probability density function
$F(x) = K(4-x^2)$ if $-2 \leq x \leq 2$
$= 0$ otherwise
then P $[-1 < x < 1]$ =

a) $\frac{1}{3}$ b) $\frac{13}{16}$ c) $\frac{11}{16}$ d) $\frac{1}{2}$

28. If $F(x) = \frac{x+2}{18}$, where $-2 < x < 4$ is the p.d.f. of r.v. x, then the value of P $(|x| < 2)$ is

a) $\frac{5}{9}$ b) $\frac{1}{9}$ c) $\frac{2}{9}$ d) $\frac{4}{9}$

64. The p.d.f. of a continuous r.v. X is $f(x) = \begin{cases} 3-6x^2, 0<x<1 \\ 0, \text{otherwise} \end{cases}$, then $P\left(\frac{1}{4}<x<\frac{1}{3}\right) =$

a) $\frac{23}{96}$ b) $\frac{52}{243}$ c) $\frac{75}{243}$ d) $\frac{179}{864}$

[MHT - CET 2024]

65. Three balanced coins are tossed simultaneously. If X denotes the number of heads, then the probability distribution of X is

a)

X	0	1	2	3
P (X)	1/8	3/8	3/8	1/8

b)

X	0	1	2	3
P (X)	3/8	1/8	1/8	3/8

c)

X	0	1	2	3
P (X)	3/8	1/8	3/8	1/8

d)

X	0	1	2	3
P (X)	1/8	3/8	1/8	3/8

66. Two cards are drawn successively with replacement from a well shuffled pack of 52 cards. Let X denote the random variable of number of jacks obtained in the two drawn cards. Then P (X = 1) + P (X = 2) equals

a) $\frac{24}{169}$ b) $\frac{25}{169}$ c) $\frac{49}{169}$ d) $\frac{52}{169}$

67. A bag contains 4 red and 3 black balls. One ball is drawn and then replaced in the bag and the process is repeated. Let X denote the number of times black ball is drawn in 3 draws. Assuming that at each draw, each ball is equally likely to be selected, then the probability distribution of X is given by

a)

X	0	1	2	3
P (X)	1/7	3/7	12/7	1/7

b)

X	0	1	2	3
P (X)	4/7	3/7	12/7	4/7

c)

X	0	1	2	3
P (X)	$(4/7)^2$	$(3/7)^2$	$(12/7)^2$	$(4/7)^2$

d)

X	0	1	2	3
P (X)	$(4/7)^3$	$(9/7)(4/7)^2$	$(12/7)(3/7)^2$	$(3/7)^3$

68. A random variable has following probability distribution. Then the value of k is

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

a) $\frac{1}{10}$ b) $\frac{3}{20}$ c) $\frac{1}{30}$ d) $\frac{1}{100}$

69. For p.m.f., if $P(X=x) = \begin{cases} \frac{k \cdot 2^x}{x!}, x = 0,1,2,3; k>0 \\ 0, \text{otherwise} \end{cases}$, then $k =$

a) $\frac{1}{19}$ b) $\frac{2}{19}$ c) $\frac{3}{19}$ d) $\frac{5}{19}$

70. The p.m.f. of a r.v. is

$$P(X=x) = \begin{cases} \frac{1}{2^5} {}^5C_x, x = 0,1,\ldots,5 \\ 0, \text{otherwise} \end{cases}$$

Then which of the following is not correct ?

a) $P(X=0) = P(X=5)$ b) $P(X \le 1) = P(X \ge 4)$

c) $P(X \le 2) = P(X \ge 3)$ d) $P(X \le 2) > P(X \ge 3)$