CBSE NCERT Based Chapter wise Questions (2025-2026)

Class-XII

Subject: MATHEMATICS

Chapter Name : Probability (Chap : 13)

Total : 12 Marks (expected) [MCQ(1)-2 Mark, VSA-(2)-2 Marks, SA-(1)-3 Marks, LA(1)-5 Marks]

Level - 1 & 2 (Higher Order)

Section - A

MCQ Type :

1. If the adds against an event are 4 : 5, then the probability of occurrence of the event is

Ⓐ $\frac{5}{9}$ Ⓑ $\frac{4}{9}$ Ⓒ $\frac{4}{5}$ Ⓓ $\frac{1}{9}$

2. If $(A \cap B) = \frac{5}{13}$, then the value of $P(A^C \cup B^C)$ is

Ⓐ $\frac{4}{13}$ Ⓑ $\frac{6}{13}$ Ⓒ $\frac{7}{13}$ Ⓓ $\frac{8}{13}$

3. According to Baye's Theorem, which of the following correctly expresses the relationship between conditional probabilities ?

Ⓐ $P(A|B) = \frac{P(B|A).P(B)}{P(A)}$ Ⓑ $P(A|B) = \frac{P(B|A).P(A)}{P(B)}$ Ⓒ $P(A|B) = P(B|A).P(A)$ Ⓓ $P(A|B) = \frac{P(A \cap B)}{P(A)}$

4. In the context of Baye's Theorem, which is the term P(A) usually referred to as ?

Ⓐ Posterior probability Ⓑ Likelihood Ⓒ Prior probability Ⓓ Evidence

5. Var (a), a is a constant is

Ⓐ 0 Ⓑ 1 Ⓒ a^2.Var(X) Ⓓ a^2

6. S.D (Standard Deviation) of x is σ then σ =

Ⓐ $\sqrt{var(x)}$ Ⓑ $\sqrt{E\left(x - \bar{x}\right)^2}$ Ⓒ $\sqrt{E(x^2) - (E(x))^2}$ Ⓓ all of these

7. The value of $E\left(x - \bar{x}\right)$

Ⓐ 0 Ⓑ 1 Ⓒ 2 Ⓓ 3

Section - B

very short answer (VSA) :

1. $A_1, A_2, \ldots$ An are independent events such that
$P(Ai) = (1 - q_i)$; i = 1, 2, 3, ... n. Prove that
$P(A_1 \cup A_2 \cup A_3 \cup .... \cup A_n) = 1 - q_1 q_2 .... q_n$

2. P (Exactly one of the event A and B) = P(A) + P(B) – 2P(AB)

3. For three mutually exclusive events x, y and z it is given that P(x) = 2P(Y) = 3 P(Z) and X∪Y∪Z = S, where S denotes sure event. Find the value of P(x).

4. If A and B are two events associated with a random experiment such that P(B) = 0.35, P(A or B) = 0.85 and P(A and B) = 0.15, find P(A).

5. If $P\left(\overline{A} \cup \overline{B}\right) = \frac{5}{6}, P\left(A\right) = \frac{1}{2}, P\left(\overline{B}\right) = \frac{2}{3}$ are the events A and B independent ?

6. Prove that E(ax + b) = aE(x) + b

7. Prove that V (ax + b) = a^2 var(X).

Section - C

Short Answer Question (SA) :

1. A and B are independent events such that $P\left(A \cap \overline{B}\right) = \frac{1}{4}$ and $P\left(\overline{A} \cap B\right) = \frac{1}{6}$. Find P(A) and P(B).

2. A and B throw a pair of dice alternately, till one of them gets a total of 10 and wins the game. Find their respective probabilities of winning, if A starts first.

3. BAG I contains 4 white and 5 black balls. Bag II contains 6 white and 7 black balls. A ball is drawn randomly from bag I is transferred to bag II and then a ball is drawn randomly from bag II. Find the probability that the ball drawn is white.

4. Find the probability distribution of the numbers of boys in families having three children, assuming equal probability for a boy and a girl.

5. A bag contains 4 balls. Two balls are drawn at random (without replacement) and are found to be white. What is the probability that all the balls in he bag are white ?

6. If 12 identical balls are to be placed in 3 identical boxes, then the probability that one of the boxes contains exactly 3 balls is _____

7. Cards are drawn one by one without replacement from a well shuffled pack of 52 cards. Then the probability that a face card (Jack, Queen or King) will appear for the first time on the third turn is equal to _____

Section - D

Long Answer Question (LA) :

1. A gambler rolls two unbiased dice and stands to loss ₹2 if he fails to throw a six, to win ₹4 if he throws one six and to win ₹10 if he throws two sixes. Is the game fair ?

2. State and prove Baye's theorem.

3. A card from a pack of 52 cards is lost. From the remaining cards of the pack, two cards are drawn and are found to be both diamonds. find the probability of the lost card being a diamond.

4. An insurance company insured 2000 scooter drivers, 4000 car drivers and 6000 truck drivers. The probabilities of accident involving a scooter, a car and a truck are $\frac{1}{100}, \frac{3}{100}$ and $\frac{3}{20}$ respectively. One of the insured persons meets an accident. What is the probability that he is scooter driver ?

5. A speaks the truth 8 times out of 10 times. A die is thrown. He reports that it was 5. What is the probability that it was actually 5 ?

6. The odds that a book will be favourably reviewed by three independent critics are 5 to 2, 4 to 3 and 3 to 4 respectively ; what is the probability that of the three a majority will be favourable ?

7. The probabilities for A, B and C hitting a target are $\frac{1}{3}, \frac{1}{5}$ and $\frac{1}{4}$ respectively. If they try together, find the probability of exactly one shot hitting the target.

Section - A

1. Ⓐ
2. Ⓓ
3. Ⓑ
4. Ⓒ
5. Ⓐ
6. Ⓓ
7. Ⓐ

Section - B

3. $\frac{6}{11}$
4. 0.65
5. Yes

Section - C

1. $P(A) = \frac{3}{4}, P(B) = \frac{2}{3}$
2. $P(A) = \frac{12}{23}, P(B) = \frac{11}{23}$
3. $\frac{29}{63}$
4.

x	0	1	2	3
P(x)	$\frac{1}{8}$	$\frac{3}{8}$	$\frac{1}{8}$	$\frac{3}{8}$

5. 0.6
6. $\frac{55}{3} \times \left(\frac{2}{3}\right)^{11}$
7. $\frac{12}{85}$

Section - D

1. $E(x) = 0$
3. 0.22
4. $\frac{1}{52}$
5. $\frac{4}{9}$
6. $\frac{209}{343}$
7. $\frac{13}{30}$