

Chapter 15 - Probability

Classical Probability

Past Year Questions

PYQ May 18

- (1) Two broad divisions of probability are:
- Subjective probability and objective probability
 - Deductive probability and mathematical probability
 - Statistical probability and mathematical probability
 - None of these

PYQ May 18

- (2) The term "chance" and probability are synonyms:
- True
 - False
 - Both
 - None of these

PYQ May 18

- (3) Sum of all probabilities mutually exclusive and exhaustive events is equal to
- 0
 - 1/2
 - 1/4
 - 1

PYQ Nov. 18

- (4) The probability that a leap year has 53 Wednesday is
- $\frac{2}{7}$
 - $\frac{3}{5}$
 - $\frac{2}{3}$
 - $\frac{1}{7}$

PYQ Nov. 18

- (5) Two different dice are thrown simultaneously, then the probability, that the sum of two numbers appearing on the top of dice is 9 is:
- $\frac{8}{9}$
 - $\frac{1}{9}$
 - $\frac{7}{9}$
 - None of these

PYQ June 19

- (6) Two event A and B are such that they do not occurs simultaneously then they are called _____ events
- Mutually exhaustive
 - Mutually exclusive
 - Mutually independent
 - Equally likely

PYQ June 19

- (7) According to bayee's theorem,
- $$P(E_k / A) = \frac{P(E_k)P(A/E_k)}{\sum_{i=1}^n P(E_i)P(A/E_i)} \text{ here}$$
- E_1, E_2, \dots are mutually exclusive
 - $P(E/A_1), P(E/A_2), \dots$ are equal to 1
 - $P(A_1/E), P(A_2/E), \dots$ are equal to 1
 - $A \& E_i$'s are disjoint sets

Note: Bayes Theorem is out of syllabus

PYQ June 19

- (8) When 2 - dice are thrown simultaneously then the probability of getting at least one 5 is
- $\frac{11}{36}$
 - $\frac{5}{36}$
 - $\frac{8}{15}$
 - $\frac{1}{7}$

PYQ Nov. 19

- (9) A bag contains 15 one rupee coins, 25 two rupees coins and 10 five rupee coins if a coin is selected at random than probability for not selecting a one rupee coin is:
- 0.30
 - 0.20
 - 0.25
 - 0.70

PYQ Nov. 19

- (10) What is the probability of occurring 4 or more than 4 accidents.

No. of acc.	Frequency
0	36
1	27
2	33
3	29
4	24
5	27
6	18
7	9

- 24
- 69
- 38
- 80

PYQ Nov. 20

- (11) When two coins are tossed simultaneously the probability of getting at least one tail?
- 1
 - 0.75
 - 0.5
 - 0.25

PYQ Nov. 20

- (12) When 3 dice are rolled simultaneously the probability of a number on the 3rd dice is greater than the sum of the numbers on two dice.
- a. $\frac{12}{216}$ b. $\frac{36}{216}$
c. $\frac{48}{216}$ d. $\frac{20}{216}$

PYQ Jan. 21

- (13) An event that can be subdivided into further events is called as.
- a. A composite event
b. A complex event
c. A mixed event
d. A simple event

PYQ Jan. 21

- (14) Three identical and balanced dice are rolled. The probability that the same number will appear on each of them is.
- a. $\frac{1}{6}$ b. $\frac{1}{18}$
c. $\frac{1}{36}$ d. $\frac{1}{24}$

PYQ Jan. 21

- (15) A basket contains 15 white balls, 25 red balls and 10 blue balls. If a ball is selected at random, the probability of selecting not a white ball.
- a. 0.20 b. 0.25
c. 0.60 d. 0.70

PYQ Jan. 21

- (16) Two dice are thrown simultaneously. The probability of a total score of 5 from the out comes of dice is.
- a. $\frac{1}{18}$ b. $\frac{1}{12}$
c. $\frac{1}{9}$ d. $\frac{2}{5}$

PYQ Jan. 21

- (17) If an unbiased coin is tossed twice, then the probability of obtaining at least one tail is.
- a. 1 b. 0.5
c. 0.75 d. 0.25

PYQ Jan. 21

- (18) If an unbiased coin is tossed three times, what is the probability of getting more than one head?
- a. $\frac{1}{2}$ b. $\frac{3}{8}$
c. $\frac{7}{8}$ d. $\frac{1}{3}$

PYQ Dec. 21

- (19) Which of the following pair of events E and F are mutually exclusive?
- a. $E = (\text{Ram's age is 13})$ and $F = (\text{Ram is studying in a college})$
b. $E = (\text{Sita studies in a school})$ and $F = (\text{Sita is a play back singer})$
c. $E = (\text{Raju is an elder brother in a family})$ and $F = (\text{Raju's father has more than one son})$
d. $E = (\text{Banu studied B.A. English literature and})$ and $F = (\text{Banu can read English novels})$

PYQ June 22

- (20) What is the probability of occurrence of leap year having 53 Sunday?
- a. $\frac{1}{7}$ b. $\frac{2}{7}$
c. $\frac{3}{7}$ d. $\frac{4}{7}$

PYQ June 22

- (21) Two perfect dice are rolled what is the probability that one appears at least in one of the dice?
- a. $\frac{7}{36}$ b. $\frac{11}{36}$
c. $\frac{9}{36}$ d. $\frac{15}{36}$

PYQ June 22

- (22) If $p:q$ are the odds in favour of an event, then the probability of that event is -
- a. $\frac{p}{q}$ b. $\frac{p}{p+q}$
c. $\frac{q}{p+q}$ d. $\frac{q}{p}$

PYQ Dec 22

- (23) The probability that a leap year has 53 Monday is:
- a. $\frac{1}{7}$ b. $\frac{2}{3}$
c. $\frac{2}{7}$ d. $\frac{3}{5}$

PYQ Dec 22

- (24) If a number is selected at random from the first 50 natural numbers, what will be the probability that the selected number is a multiple of 3 and 4?
- a. $\frac{5}{50}$ b. $\frac{2}{25}$
c. $\frac{3}{30}$ d. $\frac{4}{25}$

- PYQ Dec 22**
 (25) If three coins are tossed simultaneously, what is the probability of getting two heads together?

a. $\frac{1}{4}$ b. $\frac{1}{8}$
 c. $\frac{5}{8}$ d. $\frac{3}{8}$

- PYQ Jun 23**
 (26) Four persons are chosen at random from a group of 3 men, 2 women and 4 children. The probability that exactly 2 of them are children is

a. $\frac{10}{21}$ b. $\frac{1}{12}$
 c. $\frac{1}{5}$ d. $\frac{1}{9}$

- PYQ Dec 23**
 (27) A box contains 20 electrical bulbs out of which 4 are defective. Two bulbs are chosen at random from this box. The probability that at least one of them is defective.

a. $\frac{7}{19}$ b. $\frac{4}{19}$
 c. $\frac{12}{19}$ d. $\frac{15}{19}$

- PYQ Dec 23**
 (28) If a card is drawn at random from a pack of 52 cards, what is the chance of getting a Club or a King?

a. $\frac{13}{52}$ b. $\frac{4}{52}$
 c. $\frac{17}{52}$ d. $\frac{16}{52}$

- PYQ Sep 24**
 (29) Eight labourers are working at a construction site with the following wages for each day of working (in ₹): 500, 620, 400, 700, 450, 560, 320, 450. If one of the workers is selected at random, what is the probability that his wage would be less than the average wage?

a. 0.375 b. 0.625
 c. 0.500 d. 0.450

- PYQ Sep 24**
 (30) A box contains shoe pairs of same pattern of different sizes numbered from 1 to 12. If a shoe pair is selected at random, what is the probability that the number on the shoe pair will be a multiple of 5 or 6?

a. 0.25 b. 0.33
 c. 0.20 d. 0.375

- PYQ Sep 24**
 (31) Two cards are drawn at random from a pack of 52 cards. The probability of getting either both the red cards or both Kings cards is:

a. 0.4288 b. 0.2488
 c. 0.8248 d. 0.8428

Answer Key

1 a	2 a	3 d
4 a	5 b	6 b
7 a	8 a	9 d
10 c	11 b	12 d
13 a	14 c	15 d
16 c	17 c	18 a
19 a	20 b	21 b
22 b	23 c	24 b
25 d	26 a	27 a
28 d	29 c	30 b
31 b		

Classical Probability

Mock Test Paper Questions

MTP May 18

- (1) If $p : q$ is the odds in favor of an event, then the probability of that event is

a. $\frac{p}{q}$
 b. $\frac{q}{p+q}$
 c. $\frac{p}{p+q}$
 d. None of these

MTP May 18

- (2) If $P(A) = \frac{4}{9}$; then odd against the event 'A' is
- a. 4:9 b. 4:5
 c. 5:4 d. 4:14

MTP Nov 18

- (3) The probability of A solving a problem is $\frac{7}{12}$ the odds against solving a problem
- a. 5:7 b. 4:7
 c. 5:8 d. 4:5

MTP Nov 18

- (4) If two letters are taken at random from the word HOME, what is the Probability that none of the letters would be vowels?

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

MTP Nov 18

- (5) From a bag containing 10 black and 20 white balls, a ball is drawn at random. What is the probability that is black?

a. $\frac{1}{2}$ b. $\frac{1}{3}$
c. 1 d. 2

MTP May 19

- (6) If a card is drawn at random from a pack of 52 cards, what is the chance of getting a Spade or an ace?

a. $\frac{4}{13}$ b. $\frac{5}{13}$
c. 0.25 d. 0.20

MTP Nov 19

- (7) If one card is drawn at random from a pack of playing cards; find the probability it is neither a hearts nor a club:

a. $\frac{1}{2}$ b. $\frac{1}{4}$
c. $\frac{1}{8}$ d. None of these

MTP Nov 19

- (8) Three balls are drawn at random from a bag containing 6 blue and 4 red balls. What is the chance that 2 balls are blue and 1 is red?

a. $\frac{1}{4}$ b. $\frac{3}{4}$
c. $\frac{1}{2}$ d. None of these

MTP May 20

- (9) What is the chance of picking a spade or an ace not of spade from a pack of 52 cards?

a. $\frac{4}{13}$ b. $\frac{2}{13}$
c. $\frac{3}{26}$ d. $\frac{3}{18}$

MTP Nov 20

- (10) What is the probability of getting neither total of 7 nor 11 when the pair of dice is tossed?

a. $\frac{7}{9}$ b. $\frac{2}{9}$
c. $\frac{3}{9}$ d. $\frac{4}{9}$

MTP March 21

- (11) In a non-leap year, the probability of getting 53 Sundays or 53 Tuesday or 53 Thursday is

a. $\frac{4}{7}$ b. $\frac{2}{7}$
c. $\frac{3}{7}$ d. $\frac{1}{7}$

MTP Apr 21

- (12) If a card is drawn at random from a pack of cards, what is the chance of getting a Spade or an ace?

a. $\frac{4}{13}$ b. $\frac{5}{13}$
c. 0.25 d. 0.20

MTP Apr 21

- (13) A card is drawn from a pack of playing cards at random. What is the probability that the card drawn a king or red colour?

a. $\frac{1}{4}$ b. $\frac{4}{13}$
c. $\frac{7}{13}$ d. $\frac{1}{2}$

MTP Nov 21

- (14) One card is drawn from a pack of 52, what is the probability that is a king or queen ?

a. $\frac{11}{13}$ b. $\frac{2}{13}$
c. $\frac{1}{13}$ d. None of these

MTP Nov 21

- (15) The probability that a leap year has 53 Wednesday is

a. $\frac{2}{7}$ b. $\frac{5}{3}$
c. $\frac{2}{3}$ d. $\frac{1}{7}$

MTP Nov 21

- (16) A coin is tossed six times, then the probability of obtaining heads and tails alternatively is

a. $\frac{1}{2}$ b. $\frac{1}{64}$
c. $\frac{1}{32}$ d. $\frac{1}{16}$

MTP Nov 21

- (17) Two different dice are thrown simultaneously, then the probability, that the sum of two numbers appearing on the top of dice 9 is

a. $\frac{8}{9}$ b. $\frac{1}{9}$
c. $\frac{7}{9}$ d. None of these

MTP Oct 21

- (18) Following are the wages of 8 workers in rupees: 50, 62, 40, 70, 45, 56, 32, 45. If one of the workers is selected at random, what is the probability that his wage would be lower than the average wage?

a. 0.625 b. 0.500
c. 0.375 d. 0.450

MTP Dec 22 – Series I

- (19) Let P be a probability function on $S = \{X_1, X_2, X_3\}$ if $P(X_1) = \frac{1}{4}$ and $P(X_3) = \frac{1}{3}$ then $P(X_2)$ is

a. $\frac{5}{12}$ b. $\frac{7}{12}$
c. $\frac{3}{4}$ d. None of these

MTP Dec 22 – Series I

- (20) In a non-leap year, the probability of getting 53 Sundays or 53 Tuesdays, or 53 Thursdays is:

a. $\frac{4}{7}$ b. $\frac{2}{7}$
c. $\frac{3}{7}$ d. $\frac{1}{7}$

MTP Dec 22 Series II

- (21) When 2 dice are thrown simultaneously then the probability of getting at least one 5 is:
- a. $\frac{11}{36}$ b. $\frac{5}{36}$
 c. $\frac{8}{15}$ d. $\frac{1}{7}$

MTP Dec 22 Series II

- (22) The probability that a leap year has 53 Wednesday is:
- a. $\frac{2}{7}$ b. $\frac{3}{5}$
 c. $\frac{1}{7}$ d. $\frac{2}{3}$

MTP June 2023 Series I

- (23) Ticket numbered 1 to 20 are mixed up and then a ticket is drawn at random. What is the probability that the ticket drawn bears a number which is multiple of 3 or 7?
- a. $\frac{1}{5}$ b. $\frac{2}{5}$
 c. $\frac{3}{5}$ d. None of these

MTP June 2023 Series I

- (24) The probability that a leap year has 53 Sunday is:
- a. $\frac{1}{7}$ b. $\frac{2}{3}$
 c. $\frac{2}{7}$ d. $\frac{3}{5}$

MTP June 2023 Series

- (25) If three coins are tossed simultaneously, what is the probability of getting two heads together?
- ★ a. $\frac{1}{4}$ b. $\frac{1}{8}$
 c. $\frac{5}{8}$ d. $\frac{3}{8}$

MTP June 2023 Series II

- (26) If a card is drawn randomly from a deck, the probability of the card being neither a red card nor a face card?
- ★ a. $\frac{5}{13}$ b. $\frac{6}{17}$
 c. $\frac{12}{27}$ d. $\frac{5}{7}$

MTP June 2023 Series II

- (27) If two dice are thrown then what is the probability that the sum of the faces of dice are square or cube number?
- a. $\frac{1}{4}$ b. $\frac{1}{2}$
 c. $\frac{1}{3}$ d. None of these

MTP Dec 2023 Series I

- (28) If a card is drawn at random from a pack of cards, what is the chance of getting spade or an ace?
- a. $\frac{4}{13}$ b. $\frac{5}{13}$
 c. 0.25 d. 0.20

MTP Dec 2023 Series I/ MTP Sep 24 I

- (29) The chance of getting a sum of 10 in a simple single throw is
- a. $\frac{10}{36}$ b. $\frac{1}{2}$
 c. $\frac{1}{12}$ d. None of these

MTP Dec 2023 Series II

- (30) Exactly 3 girls are to be selected from 5 girls and 3 boys. The Probability of selecting 3 girls will be
- a. $\frac{5}{28}$ b. $\frac{1}{56}$
 c. $\frac{15}{28}$ d. None of these

MTP June 24 Series I

- (31) A bag contains 15 one rupee coins, 25 two rupee coins and 10 five rupee coins. If a coin is selected at random from the bag, then the probability of not selecting a one rupee coin is:
- a. 0.30 b. 0.70
 c. 0.25 d. 0.20

MTP June 24 Series II

- (32) A letter is taken out at random from the word RANGE and another is taken out from the word PAGE. The probability that they are the same letters is:
- a. $\frac{1}{20}$ b. $\frac{3}{20}$
 c. $\frac{3}{5}$ d. $\frac{3}{4}$

MTP June 24 Series III

- (33) If $P(A) = \frac{4}{9}$; then odd against the event 'A' is
- a. $4:9$ b. $4:5$
 c. $5:4$ d. $4:14$

MTP June 24 Series III

- (34) If p: q is the odds in favor of an event, then the probability of that event is -
- a. $\frac{p}{q}$ b. $\frac{q}{p+q}$
 c. $\frac{p}{p+q}$ d. None of these

MTP Sep 24 Series II

- (35) There are two boxes containing 5 white and 6 blue balls and 3 white and 7 blue balls respectively. If one of the boxes is selected at random and a ball is drawn from it, then the probability that the ball is blue is
- a. $\frac{115}{227}$ b. $\frac{83}{250}$
 c. $\frac{137}{220}$ d. $\frac{127}{250}$

MTP Sep 24 Series II

- (36) A box contains 5 white and 7 black balls. Two successive drawn of 3 balls are made (i) with replacement (ii) without replacement. The probability that the first draw would produce white balls and the second draw would produce black balls are respectively.
- a. $\frac{6}{321}$ and $\frac{3}{926}$
 b. $\frac{1}{20}$ and $\frac{1}{30}$
 c. $\frac{35}{144}$ and $\frac{35}{108}$
 d. $\frac{7}{968}$ and $\frac{5}{264}$

MTP Sep 24 Series III/ RTP Sep 24

- (37) X and y are stand in a line with 6 people. What is the probability that there are three persons between them?

a. $\frac{1}{5}$ b. $\frac{1}{6}$
c. $\frac{1}{7}$ d. $\frac{1}{3}$

MTP Sep 24 Series II

- (38) Probability of getting a head when two unbiased coins are tossed simultaneously is

a. 0.25 b. 0.50
c. 0.20 d. 0.75

Answer Key

1 c	2 c	3 a
4 a	5 b	6 a
7 a	8 c	9 a
10 a	11 c	12 a
13 c	14 b	15 a
16 c	17 b	18 b
19 a	20 c	21 a
22 a	23 b	24 c
25 a	26 a	27 c
28 a	29 c	30 a
31 b	32 b	33 c
34 c	35 c	36 d
37 c	38 b	

Set based Probability

Past Year Questions

PYQ May 18

- (1) What is the probability of having at least one 'six' in 3 throws of a project die?
- a. $\frac{5}{6}$ b. $(\frac{5}{6})^3$
c. $1 - (\frac{1}{6})^3$ d. $1 - (\frac{5}{6})^3$

PYQ Nov. 18

- (2) If $P(A) = \frac{1}{2}$, $P(B) = \frac{1}{3}$, and $P(A \cap B) = \frac{1}{4}$, then $P(A \cup B)$ is equal to
- a. $\frac{11}{12}$ b. $\frac{10}{12}$
c. $\frac{7}{12}$ d. $\frac{1}{6}$

PYQ Nov. 18

- (3) A coin is tossed six times, then the probability of obtaining heads and tails alternatively is
- a. $\frac{1}{2}$ b. $\frac{1}{64}$
c. $\frac{1}{32}$ d. $\frac{1}{16}$

PYQ Nov. 18

- (4) Ram is known to hit a target in 2 out of 3 shots where as shyam is known to hit the same target in 5 out of 11 shots. What is the probability that the target would be hit if they both try?

a. $\frac{9}{11}$ b. $\frac{3}{11}$
c. $\frac{10}{33}$ d. $\frac{6}{11}$

PYQ Nov. 18

- (5) If $P(A \cup B) = 0.8$ and $P(A \cap B) = 0.3$, then $\star P(\bar{A}) + P(\bar{B})$ is equal to

a. 0.3 b. 0.5
c. 0.7 d. 0.9

PYQ June 19

- (6) If a coin is tossed 5 times then the probability of getting Tail and Head occurs alternatively is

a. $\frac{1}{8}$ b. $\frac{1}{16}$
c. $\frac{1}{32}$ d. $\frac{1}{64}$

PYQ Nov. 19

- (7) Two letters are chosen from the word HOME. What is the probability that the letters chosen are not vowels.

a. $\frac{1}{2}$ b. $\frac{1}{6}$
c. $\frac{2}{3}$ d. 0

PYQ Nov. 19

- (8) If A, B, C are three mutually exclusive and exhaustive events such that:

$P(A) = 2P(B) = 3P(C)$ what is $P(B)$?

a. $\frac{6}{11}$ b. $\frac{3}{11}$
c. $\frac{1}{6}$ d. $\frac{1}{3}$

PYQ Nov. 19

- (9) What is the probability of getting 7 or 11 when two dices are thrown?

a. $\frac{2}{9}$ b. $\frac{6}{36}$
c. $\frac{10}{36}$ d. $\frac{2}{36}$

PYQ Nov. 20

- (10) When 2 fair dice are thrown, what is the probability of getting the sum which is a multiple of 3?

a. $\frac{4}{36}$ b. $\frac{13}{36}$
c. $\frac{2}{36}$ d. $\frac{12}{36}$

PYQ Nov. 20

- (11) If A speaks 75% of truth and B speaks 60% of truth. In what percentage both of them likely contradict with each other in narrating the same questions?

a. 0.60 b. 0.45
c. 0.65 d. 0.35

PYQ July 21

- (12) If there are 48 marbles marked with numbers 1 to 48, then the probability of selecting a marble having the number divisible by 4 is:
- a. $\frac{1}{2}$ b. $\frac{2}{3}$
c. $\frac{1}{3}$ d. $\frac{1}{4}$

PYQ July 21

- (13) A bag contains 7 blue and 5 green balls. One ball is drawn at random. The probability of getting a blue ball is _____.
- a. $\frac{5}{12}$ b. $\frac{12}{35}$
c. $\frac{7}{12}$ d. 0

PYQ July 21

- (14) The probability that a football team losing a match at Kolkata is $\frac{3}{5}$ and winning a match at Bengaluru is $\frac{6}{7}$; the probability of the team winning at least one match is _____.
- a. $\frac{3}{35}$ b. $\frac{18}{35}$
c. $\frac{32}{35}$ d. $\frac{17}{35}$

PYQ July 21

- (15) A biased coin is such that the probability of getting a head is thrice the probability of getting a tail, if the coin is tossed 4 times, what is the probability of getting a head all the times?
- a. $\frac{2}{5}$ b. $\frac{81}{128}$
c. $\frac{81}{256}$ d. $\frac{81}{64}$

PYQ July 21

- (16) If there are 16 phones, 10 of them are Android and 6 of them Apple, then the probability of 4 randomly selected phones to include 2 Android and 2 Apple phone is:
- a. 0.47 b. 0.51
c. 0.37 d. 0.27

PYQ June 22

- (17) A dice is rolled twice. Find the probability of getting numbers multiple of 3 or 5?
- a. $\frac{1}{3}$ b. $\frac{1}{4}$
c. $\frac{19}{36}$ d. $\frac{1}{6}$

PYQ June 22

- (18) If in a bag of 30 balls numbered from 1 to 30. Two balls are drawn find probability of getting a ball being multiple of 2 or 5
- a. $\frac{108}{465}$ b. $\frac{117}{435}$
c. $\frac{117}{300}$ d. $\frac{116}{485}$

PYQ June 22

- (19) If $P(A) = 0.3$; $P(B) = 0.8$ and $P\left(\frac{B}{A}\right) = 0.5$, find $P(A \cup B)$
- a. 0.85 b. 0.95
c. 0.55 d. 0.5

PYQ Dec 22

- (20) If $P(A) = \frac{1}{3}$, $P(B) = \frac{3}{4}$ and $P(A \cup B) = \frac{11}{12}$ then $P\left(\frac{B}{A}\right)$ is:
- a. $\frac{1}{6}$ b. $\frac{4}{9}$
c. $\frac{1}{2}$ d. $\frac{1}{8}$

PYQ Jun 23

- (21) For any two events 'A' and 'B' it is known that $P(A) = \frac{2}{3}$, $P(B) = \frac{3}{8}$ and $P(A \cap B) = \frac{1}{4}$, then the events A and B are:
- a. Mutually exclusive and Independent
b. Mutually not exclusive and Independent
c. Mutually exclusive but not independent
d. Neither independent nor mutually exclusive

PYQ June 23

- (22) The probability that a four digit number comprising the digits 2, 5, 6 and 7 without repetition of digits, would be divisible by 4 is
- a. $\frac{1}{2}$ b. $\frac{3}{4}$
c. $\frac{1}{4}$ d. $\frac{1}{3}$

PYQ Dec 23

- (23) If $P(A) = \frac{1}{2}$ and $P(B) = \frac{1}{3}$ and $P(A \cup B) = \frac{2}{3}$ then find $P(A \cap B)$
- a. $\frac{1}{4}$ b. $\frac{2}{3}$
c. $\frac{1}{6}$ d. $\frac{1}{2}$

PYQ Dec 23

- (24) A number is selected from the first 30 natural numbers. What is the probability that it would be divisible by 3 or 8?
- a. 0.2 b. 0.4
c. 0.6 d. 0.8

PYQ Dec 23

(25) If $P(A \cap B) = \frac{1}{3}$, $P(A \cup B) = \frac{5}{6}$, $P(\bar{B}) = \frac{1}{2}$,

then $P(\bar{A})$ is:

- a. $\frac{2}{3}$ b. $\frac{1}{3}$
 c. $\frac{1}{4}$ d. $\frac{3}{4}$

PYQ Dec 23

(26) A number is selected at random from the first 100 natural numbers. What is the probability that it would be a multiple of 3 or 7?

- a. $\frac{33}{100}$ b. $\frac{4}{100}$
 c. $\frac{21}{100}$ d. $\frac{43}{100}$

PYQ June 24

(27) A number is selected at random from the set $(1, 2, \dots, 99)$. The probability that it is divisible by 9 or 11 is _____

- a. $\frac{19}{100}$ b. $\frac{19}{99}$
 c. $\frac{10}{100}$ d. $\frac{10}{99}$

PYQ June 24

(28) A question in statistics is given to three students A, B and C. Their chances of solving the question are $\frac{1}{3}$, $\frac{1}{5}$ and $\frac{1}{7}$ respectively. The probability that the question would be solved is

- a. $\frac{19}{35}$ b. $\frac{16}{35}$
 c. $\frac{1}{105}$ d. $\frac{104}{105}$

PYQ June 24

(29) A company produces two types of products, A and B. The probability of a defective product in type A is 0.05 and in type B is 0.03. If the company produces 60% type A and 40% type B, what is the probability of a randomly selected product being defective?

- a. 0.042 b. 0.03
 c. 0.048 d. 0.052

PYQ Sep 24

(30) Which one holds correct for any two events A and B?

- a. $P(A - B) = P(A) - P(A \cap B)$
 b. $P(A - B) = P(A) - P(B)$
 c. $P(A - B) = P(B) - P(A \cap B)$
 d. $P(A - B) = P(B) + P(A \cap B)$

PYQ Sep 24

(31) Which of the following pairs of events are mutually exclusive?

- a. A: Archana was born in India
 B: She is a fine lawyer
 b. A: The student studies in a school
 B: He studies Geography
 c. A: Sita is 16 years old
 B: She is good folk dancer
 d. A: Imran is under 15 years of age
 B: He is a voter of Delhi

PYQ Sep 24

(32) The probability of success of three students in CA Foundation examination are $\frac{1}{5}$, $\frac{1}{4}$ and $\frac{1}{3}$ respectively. Find the probability that at least two students will get success.

- a. $\frac{3}{4}$ b. $\frac{2}{5}$
 c. $\frac{1}{6}$ d. $\frac{1}{5}$

PYQ Sep 24

(33) If $P(A) = 0.65$ and $P(B) = 0.15$, then $P(\bar{A}) + P(\bar{B})$ is:

- a. 1.2 b. 1.5
 c. 0.8 d. 0.35

Answer Key

1 d	2 c	3 c
4 a	5 d	6 b
7 b	8 b	9 a
10 d	11 b	12 d
13 c	14 c	15 c
16 c	17 c	18 b
19 b	20 c	21 b
22 d	23 c	24 b
25 b	26 d	27 b
28 a	29 a	30 a
31 d	32 c	33 a

Set based Probability

Mock Test Paper Questions

MTP Nov 18

- (1) Two events A & B Probabilities 0.24 and 0.52 respectively. If the probability of both A and B occurs simultaneously is 0.15. Then the probability that neither A nor B occur is 0.15, then the probabilities that neither A nor B is.
- a. 0.39 b. 0.375
 c. 0.61 d. 0.86

MTP May 19

- (2) If $P(A \cap B) = 0$, then the two events A and B are
- Mutually exclusive
 - Exhaustive
 - Equally likely
 - Independent.

MTP Nov 18

- (3) If A, B and C are mutually exclusive and exhaustive events, then $P(A) + P(B) + P(C)$ equals to
- $1/3$
 - 1
 - 0
 - Between 0 and 1

MTP May 19 Series II

- (4) Addition Theorem of Probability states that for any two events A and B
- $P(A \cup B) = P(A) + P(B)$
 - $P(A \cup B) = P(A) + P(B) + P(A \cap B)$
 - $P(A \cup B) = P(A) + P(B) - P(A \cap B)$
 - $P(A \cup B) = P(A) P(B)$

MTP May 20

- (5) Three events A, B and C are mutually exclusive, exhaustive and equally likely. What is the probably of the complementary event of A?
- $1/3$
 - $2/3$
 - $3/7$
 - 1

MTP May 20

- (6) Find the probability that a four-digit number comprising the digits 2, 5, 6 and 7 would be divisible by 4.
- $1/4$
 - $1/3$
 - $1/2$
 - 1

MTP Nov 20

- (7) If A and B are two events, such that $P(A) = 1/4$, $P(B) = 1/3$ and $P(A \cup B) = 1/2$, then $P(B/A)$ is equal to
- $3/4$
 - $1/2$
 - $1/4$
 - $1/3$

MTP March 21

- (8) If A and B are two events and $P(A) = 2/3$, $P(B) = 3/5$, $P(A \cup B) = 5/6$, then the value of $P(A' \cap B')$ is:
- $1/4$
 - $5/12$
 - $5/8$
 - $5/4$

MTP Apr 21

- (9) $P(A) = 0.45$, $P(B) = 0.36$ and $P(A \cap B) = 0.25$ then $P(A/B) = ?$
- 1.40
 - 1.80
 - 0.6944
 - 0.556

MTP JUNE 22

- (10) A husband and a wife appear in an interview for two vacancies in the same post. The probability of husband's selection is $3/5$ and that of wife's selection is $1/5$. Then the probability that only one of them is selected is
- $16/25$
 - $17/25$
 - $14/25$
 - None of these

MTP Dec 22 - Series I

- (11) Thirty balls are serially numbered and placed in a bag. Find chance that the first ball drawn is a multiple of 3 or 5
- $8/15$
 - $2/15$
 - $1/2$
 - $7/15$

MTP Dec 22 - Series I

- (12) The odds in favor of event A in a trial is 3:1. In three independent trials, the probability of non-occurrence of event A is
- $1/64$
 - $1/32$
 - $1/27$
 - 1/8

MTP Dec 22 Series II

- (13) Two events A and B are such that they do not occur simultaneously then they are called _____ events.
- Mutually exhaustive
 - Mutually Exclusive
 - Mutually Independent
 - Equally Likely

MTP June 2023 Series I

- (14) If $P(A) = 1/3$, $P(B) = 3/4$ and $P(A \cap B) = 1/6$ then $P(A/B)$ is:
- $1/6$
 - $2/9$
 - $1/2$
 - $1/8$

MTP June 2023 Series I

- (15) If a number is selected at random from the first 50 natural numbers, what will be the probability that the selected no. is a multiple of 3 and 4?
- $5/50$
 - $2/25$
 - $3/50$
 - $4/25$

MTP Jun 23 - Series II

- (16) A number is selected at random from first 70 natural numbers. What is the chance that it is a multiple of either 5 or 14?
- $6/35$
 - $8/35$
 - $10/35$
 - None of these

MTP Jun 23 - Series II

- (17) Probability of Ramesh & Deepak speaking truth is $\frac{1}{4}$, $\frac{3}{5}$. Find the probability of at most one of them speaks truth.
- a. 0.60 b. 0.85
c. 0.75 d. None of these

MTP Jun 24 Series I

- (18) Three identical dice are rolled. The probability that the same number will appear on each of them is:
- a. $\frac{1}{6}$ b. $\frac{1}{12}$
c. $\frac{1}{36}$ d. 1

MTP Jun 24 Series I

- (18) If 10 men, among whom are A and B, stand in a row, what is the probability that there will be exactly 3 men between A and B?
- a. $\frac{11}{15}$ b. $\frac{4}{15}$
c. $\frac{1}{15}$ d. $\frac{2}{15}$

MTP Jun 24 Series I

- (19) The odds in favour of A solving a problem is 5:7 and odds against B solving the same problem is 9:6. What is the probability that if both of them try, the problem will be solved?
- a. $\frac{117}{180}$ b. $\frac{181}{200}$
c. $\frac{147}{180}$ d. $\frac{119}{180}$

MTP Jun 24 Series II

- (21) Ram is known to hit a target in 2 out of 3 shots whereas Shyam is known to hit the same target in 5 out of 11 shots. What is the probability that the target would be hit if they both try?
- a. $\frac{9}{11}$ b. $\frac{6}{11}$
c. $\frac{10}{33}$ d. $\frac{3}{11}$

MTP Jun 24 Series II

- (22) If $P(A) = \frac{1}{2}$, $P(B) = \frac{1}{3}$ and $P(A \cap B) = \frac{1}{4}$ then the value of $P(\overline{A \cap B})$ is
- a. $\frac{5}{12}$ b. $\frac{7}{12}$
c. $\frac{1}{2}$ d. None of these

MTP Jun 24 Series II

- (23) In a box carrying one dozen of oranges, one third has become bad. If 3 oranges are taken out from the box at random, what is the probability that at least one orange out of the three oranges picked up is good?
- a. $\frac{54}{55}$ b. $\frac{1}{55}$
c. $\frac{45}{50}$ d. None of these

MTP Jun 24 Series II

- (24) One Card is drawn from pack of 52, what is the probability that it is a king or a queen?
- a. $\frac{11}{13}$ b. $\frac{2}{13}$
c. $\frac{1}{13}$ d. None of these

MTP Jun 24 Series III

- (25) If two letters are taken at random from the word HOME, what is the Probability that none of the letters would be vowels?
- a. $\frac{1}{6}$ b. $\frac{1}{2}$
c. $\frac{1}{3}$ d. $\frac{1}{4}$

MTP Sep 24 Series I

- (27) In connection with random experiment, it is found that $P(A) = \frac{2}{3}$, $P(B) = \frac{3}{5}$ and $P(A \cup B) = \frac{5}{6}$, Find $P(A/B)$
- a. $\frac{13}{18}$ b. $\frac{1}{2}$
c. $\frac{13}{20}$ d. $\frac{5}{18}$

MTP Sep 24 Series I

- (27) If a card is drawn at random from a pack of 52 cards, what is the chance of getting spade or an ace?
- a. $\frac{4}{13}$ b. $\frac{5}{13}$
c. 0.25 d. 0.20

MTP Sep 24 Series I

- (28) A number is selected at random from the set $\{1, 2, \dots, 99\}$. The probability that it is divisible by 9 or 11 is _____
- a. $\frac{19}{100}$ b. $\frac{19}{99}$
c. $\frac{10}{100}$ d. $\frac{10}{99}$

MTP Sep 24 Series II

- (29) For two events A and B, $P(A \cup B) = P(A) + P(B)$ only when
- a. A and B are equally likely events
b. A and B are exhaustive events
c. A and B are mutually independent
d. A and B are mutually exclusive.

Answer Key

1	a	2	a	3	b
4	c	5	b	6	b
7	d	8	b	9	c
10	c	11	d	12	a
13	b	14	b	15	b
16	d	17	b	18	c
19	d	20	a	21	a
22	a	23	a	24	b
25	a	26	d	27	a
28	b	29	d		

Conditional Probability

Past Year Exam Questions

PYQ May 18

- (1) The theorem of compound probability states that for any two events A and B

- a. $P(A \cap B) = P(A) \times P(B/A)$
 b. $P(A \cup B) = P(A) \times P(B/A)$
 c. $P(A \cap B) = P(A) \times P(B)$
 d. $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

PYQ July 21

- (2) If in a class, 60% of the student study Mathematics and science and 90% of the students study science, then the probability of a student studying mathematics given that he/she is already studying science is:

- a. $1/4$ b. $2/3$
 c. 1 d. $1/2$

PYQ Dec. 21

- (3) For any two dependent events A and B, $P(A) = 5/9$ and $P(B) = 6/11$ and $P(A \cap B) = 10/33$. What are the values of $P(A/B)$ and $P(B/A)$?

- a. $5/9, 6/11$ b. $5/6, 6/11$
 c. $1/9, 2/9$ d. $2/9, 4/9$

PYQ Dec. 21

- (4) In a group of 20 males and 15 females, 12 males and 8 females are service holders. What is the probability that a person selected at random from the group is a service holder given that the selected person is a male?

- a. 0.40 b. 0.60
 c. 0.45 d. 0.55

PYQ Dec. 21

- (5) There are 3 boxes with the below composition:

- ★ Box 1 : 7 Red + 5 White + 4 Blue balls
 Box 2 : 5 Red + 6 White + 3 Blue balls
 Box 3 : 4 Red + 3 White + 2 Blue balls

One of the boxes is selected at random and a ball is drawn from it. What is the probability that drawn ball is red?

- a. $1249/3024$ b. $1247/3004$
 c. $1147/3024$ d. $1/2$

PYQ Dec. 22

- (6) A machine is made of two parts A and B. The manufacturing process of each part is such that probability of defective in part A is 0.08 and that

B is 0.05. What is the probability that the assembled part will not have any defect?

- a. 0.934 b. 0.864
 c. 0.85 d. 0.874

PYQ Dec 22

- (7) Suppose A and B are two independent events with probabilities $P(A) \neq 0$ and $P(B) \neq 0$. Let A' and B' be their complements. Which one of the following statements is FALSE?

- a. $P(A \cap B) = P(A) \times P(B)$
 b. $P(A/B) = P(A)$
 c. $P(A \cup B) = P(A) + P(B)$
 d. $P(A' \cap B') = P(A') \times P(B')$

PYQ Dec 22

- (8) The theorem of compound probability states that for any two events A and B.

- a. $P(A \cap B) = P(A) \times P(B/A)$
 b. $P(A \cup B) = P(A) \times P(B/A)$
 c. $P(A \cap B) = P(A) \times P(B)$
 d. $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

PYQ Jun 23

- (9) Company 'A' produces 10% defective products, company 'B' produces 20% defective products and company 'C' produces 5% defective products. If choosing a company is an equally likely event, what is probability that product chosen is free from defect?

- a. 0.88
 b. 0.80
 c. 0.79
 d. 0.78

PYQ Jun 23

- (10) If $P(A) = \frac{1}{3}$, $P(B) = \frac{1}{4}$, $P(A/B) = \frac{1}{6}$, $P(B/A)$ is

- a. $1/8$ b. $1/4$
 c. $3/8$ d. $1/2$

PYQ Jun 24

- (11) Two coins are tossed. Define the events $A =$ ("the first toss is head"), $A_2 =$ (number of heads is 2); $A_1 =$ (number of heads is 1); $A_0 =$ (number of heads is 0); and $A_3 =$ ("both outcomes are alike"), The event A is independent of

- a. A_2
 b. A_1
 c. A_0
 d. A_1 and A_0 both

PYQ June 24

- (12) From a bag containing 4 red, 5 blue and 6 white caps, two caps are drawn without replacement. What is the probability that the caps are of different colours?

- a. $\frac{74}{105}$ b. $\frac{37}{105}$
 c. $\frac{94}{105}$ d. $\frac{31}{105}$

Answer Key

- | | | | | | |
|----|---|----|---|----|---|
| 1 | a | 2 | b | 3 | a |
| 4 | b | 5 | a | 6 | d |
| 7 | c | 8 | a | 9 | a |
| 10 | a | 11 | b | 12 | a |

Conditional Probability

Mock Test Paper Questions

MTP May 18

- (1) If two events A and B are independent, the probability that both will occur is given by
- a. $P(A) \times P(B)$
 b. $P(A) + P(B)$
 c. $P(A) + P(B) - P(A \cup B)$
 d. $P(A) + P(B) - P(A \cap B)$

MTP Nov 18

- (2) If $P(A) = 1$ and $P(B) = 1/3$ then $P(A/B) =$
- a. $1/3$ b. $2/3$
 c. 1 d. $1/2$

MTP Nov 18

- (3) A probability in statistics is given to five students A, B, C, D and E. Their chances of solving it are $1/2, 1/3, 1/4, 1/5, 1/6$. What's the probability that the problem will be solved?
- a. $1/6$ b. $5/6$
 c. 1 d. None

MTP May 19

- (4) Given that $P(A) = 1/2, P(B) = 1/3, P(A \cap B) = 1/4$, what is $P(A \cup B)$?
- a. $1/2$ b. $7/8$
 c. $5/8$ d. $2/3$

MTP May 19 Series II

- (5) If for two events A and B, $P(A \cap B) = P(A) \times P(B)$, then the two events A and B are
- a. Independent
 b. Dependent
 c. Not equally likely

d. Not exhaustive

MTP May 19 Series II

- (6) If an unbiased die is rolled once, odds in favour of getting a point which is a multiple of 3 is
- a. 1:2 b. 2:1
 c. 1:3 d. 3:1

MTP May 19 Series II

- (7) A, B, C are three mutually independent with probabilities 0.3, 0.2 and 0.4 respectively. What is $P(A \cap B \cap C)$?
- a. 0.400 b. 0.240
 c. 0.024 d. 0.500

MTP May 19 Series II

- (8) What is the chance of throwing at least 7 in a single cast with 2 dice?
- a. $5/12$ b. $7/12$
 c. $1/4$ d. $17/63$

MTP Nov 19

- (9) The probability that a person travels by a plane is $1/5$ and that he travels by train is $2/3$. Find the probability of his traveling neither by plane nor by train?
- a. $13/15$ b. $2/15$
 c. $1/15$ d. None of these

MTP May 20

- (10) The probability that an Accountant's job applicant has a B. Com. Degree is 0.85, that he is a CA is 0.30 and that he is both B. Com. and CA is 0.25 out of 500 applicants, how many would be B. Com. or CA?
- a. 0.25 b. 0.30
 c. 0.10 d. 0.90

Note: Number of persons are required in question and not the probability but options give probability.

MTP May 20

- (11) Rupesh is known to hit a target in 5 out of 9 shots whereas David is known to hit the same target in 6 out of 11 shots. What is the probability that the target would be hit once they both try?
- a. $79/99$ b. $10/13$
 c. $14/26$ d. $13/18$

MTP May 20

- (12) In connection with a random experiment, it is found that $P(A) = 2/3, P(B) = 3/5$ and $P(A \cup B) = 5/6$, find $P(A/B)$
- a. $7/18$ b. $1/13$
 c. $5/18$ d. $13/18$

- (13) An investment consultant predicts that the odds against the price of a certain stock going up are 2:1 and odd are in favor of the price remaining the same are 1:3. what is the probability that the price of stock will go down?

a. $\frac{5}{12}$ b. $\frac{7}{12}$
c. $\frac{1}{3}$ d. $\frac{1}{4}$

MTP Nov 20

- (14) A pair of dice rolled. If the sum of the two dice is 9, find the prob. that one of the dice showed is 3

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

MTP Nov 20

- (15) What is the probability that a leap year selected at random contains either 53 Sundays or 53 Mondays

a. $\frac{2}{7}$ b. $\frac{3}{7}$
c. $\frac{4}{7}$ d. $\frac{1}{7}$

MTP March 21

- (16) The odds are 9:5 against a person who is 50 years living till he is 70 and 8:6 against a person who is 60 living till he is 80. Find the probability that at least one of them will be alive after 20 years.

a. $\frac{11}{14}$ b. $\frac{22}{49}$
c. $\frac{31}{49}$ d. $\frac{35}{49}$

MTP March 21

- (17) What is the chance of throwing at least 7 in a single cast with two dices?

a. $\frac{5}{12}$ b. $\frac{7}{12}$
c. $\frac{1}{4}$ d. $\frac{17}{36}$

MTP Apr 21

- A bag contains 12 balls of which 3 are red and 5 balls are drawn at random. Find the probability that 5 balls 3 are red

a. $\frac{3}{132}$ b. $\frac{5}{396}$
c. $\frac{1}{36}$ d. $\frac{1}{22}$

MTP Nov 21

- (19) A bag contains 4 Red and 5 Black balls. Another bag contains 5 Red and 3 Black balls. If one ball is drawn at random each bag. Then the probability that one red and one black is

a. $\frac{12}{72}$ b. $\frac{25}{72}$
c. $\frac{37}{72}$ d. $\frac{13}{72}$

MTP Oct 21

- (20) Given that for two events A and B, $P(A) = \frac{3}{5}$, $P(B) = \frac{2}{3}$ and $P(A \cup B) = \frac{3}{4}$, what is $P(A/B)$?

a. 0.655 b. $\frac{13}{60}$
c. $\frac{31}{60}$ d. 0.775

MTP Oct 21

- (21) A problem in probability was given to three CA students A, B and C whose chances of solving it are $\frac{1}{3}$, $\frac{1}{5}$ and $\frac{1}{2}$ respectively. What is the probability that the problem would be solved?

a. $\frac{4}{15}$ b. $\frac{7}{8}$
c. $\frac{8}{15}$ d. $\frac{11}{15}$

MTP Oct 21

- (22) A packet of 10 electronic components is known to include 2 defectives. If a sample of 4 components is selected at random from the packet, what is the probability that the sample does not contain more than 1 defective?

a. $\frac{1}{3}$ b. $\frac{2}{3}$
c. $\frac{13}{15}$ d. $\frac{3}{15}$

MTP Oct 21

- (23) The probability that there is at least one error in an account statement prepared by 3 persons A, B and C are 0.2, 0.3 and 0.1 respectively. If A, B and C prepare 60, 70 and 90 such statements, then the expected number of correct statements

a. 170 b. 176
c. 178 d. 180

MTP March 22

- (24) Given that for two events A and B, $P(A) = \frac{3}{5}$, $P(B) = \frac{2}{3}$ and $P(A \cap B) = \frac{3}{4}$, what is $P(A/B)$?

a. 0.655 b. $\frac{13}{60}$
c. $\frac{31}{60}$ d. 0.775

MTP June 22

- (25) If $P(A) = \frac{1}{2}$, $P(B) = \frac{1}{3}$, $P(A \cap B) = \frac{1}{4}$, then the value of $P(A' \cup B')$ is

a. $\frac{1}{4}$ b. $\frac{3}{4}$
c. $\frac{2}{5}$ d. None of these

MTP June 22

- (26) A bag contains 5 Red and 4 Black balls. A ball is drawn at random from the bag and put into another bag contains 3 red and 7 black balls. A ball is drawn randomly from the second bag. What is the probability that it is red?

a. $\frac{32}{99}$ b. $\frac{1}{3}$
c. $\frac{74}{99}$ d. None of these

MTP Dec 22 - Series I

- (27) A speaks truth in 60% of the cases and B in 90% of the cases. In what percentage of cases are they likely to contradict each other in stating the same fact:

- a. 36% b. 42%
c. 54% d. None of these

MTP Dec 22 – Series I

- (28) A candidate is selected for interview for 3 posts. For the first there are 3 candidates, for second there are 4 and for third there are 2. What are the chances of his getting at least one post?

- a. $\frac{3}{4}$ b. $\frac{2}{3}$
c. $\frac{1}{10}$ d. 1

MTP Dec 22 – Series I

- (29) A card is drawn from a pack of playing cards and then another card is drawn without the first being replaced. What is the probability of getting two kings:

- a. $\frac{7}{52}$ b. $\frac{1}{221}$
c. $\frac{3}{221}$ d. None of these

MTP Dec 22 Series II

- (30) Ram is known to hit a target in 2 out of 3 shots whereas Shyam is known to hit the same target in 5 out of 11 shots. What is the probability that the target would be hit if they both try?

- a. $\frac{9}{11}$ b. $\frac{6}{11}$
c. $\frac{10}{33}$ d. $\frac{3}{11}$

MTP June 2023 Series I

- (31) A class consists of 10 boys and 20 girls of which half the boys and half the girls have blue eyes. Find the probability that a student chosen random is a boy and has blue eyes.

- a. $\frac{1}{6}$ b. $\frac{3}{5}$
c. $\frac{1}{2}$ d. None of these

MTP June 2023 Series I

- (32) A machine is made of two parts A and B. The manufacturing process of each part is such that probability of defective in part A is 0.08 and that B is 0.05. What is the probability that the assembled part will not have any defect?

- a. 0.934 b. 0.864
c. 0.85 d. 0.874

MTP June 2023 Series II

- (33) From a deck of 52 cards, two cards are drawn at random. What is the probability that they are a king and a queen, if the cards are drawn one after the other without replacement?

- a. $\frac{4}{52} \times \frac{4}{51}$
b. $2 \times \frac{4}{52} \times \frac{4}{51}$
c. $\frac{4}{52} \times \frac{3}{51} \times \frac{4}{52} \times \frac{3}{51}$

- d. None of these

MTP June 2023 Series II

- (34) In a poker set there are 90 chips numbered from 1 to 90. Dan picks 3 chips random, one after the other, without replacement. What is the probability that the numbers on the chips, in the order that he picks them are in descending order?

- a. $\frac{1}{3}$ b. $\frac{1}{30}$
c. $\frac{1}{6}$ d. None

MTP Dec 2023 Series I

- (35) If $P(A \cap B) = 0.10$, and $P(B') = 0.80$, then $P(A/B)$ is

- a. 11 b. 6
c. 5 d. 9

MTP Dec 2023 Series I

- (36) In connection with random experiment, it is found that $P(A) = \frac{2}{3}$, $P(B) = \frac{3}{5}$ and $P(A \cup B) = \frac{5}{6}$ Find $P(A'/B)$

- a. $\frac{13}{18}$ b. $\frac{1}{2}$
c. $\frac{13}{20}$ d. $\frac{5}{18}$

MTP Dec 2023 Series I

- (37) The probability that A speaks truth is $\frac{4}{5}$ while this probability for B is $\frac{3}{4}$. The probability that they contradict each other when asked to speak on a fact is

- a. $\frac{3}{20}$ b. $\frac{1}{5}$
c. $\frac{7}{20}$ d. $\frac{4}{5}$

MTP Dec 2023 Series II

- (38) A speaks truth in 75% cases and B in 60% of the cases. In what percentage of the cases are they likely to contradict each other, narrating the same incident?

- a. 0.60 b. 0.45
c. 0.65 d. 0.35

MTP June 24 Series I

- (39) $P(A) = \frac{2}{3}$; $P(B) = \frac{3}{5}$; $P(A \cup B) = \frac{5}{6}$
Find $P(B/A)$

- a. $\frac{11}{20}$ b. $\frac{13}{20}$
c. $\frac{13}{18}$ d. $\frac{15}{20}$

MTP June 24 Series I

- (40) The theory of compound probability states that for any two events A and B:

- a. $P(A \cap B) = P(A) \times P(B)$
b. $P(A \cap B) = P(A) \times P(B/A)$
c. $P(A \cup B) = P(A) \times P(B/A)$
d. $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

MTP June 24 Series II

- (41) Two events A and B are such that they do not occur simultaneously then they are called _____ events.
- Mutually exhaustive
 - Mutually Exclusive
 - Mutually Independent
 - Equally Likely

MTP June 24 Series II

- (42) A bag contains 8 red and 5 white balls. Two successive draws of 3 balls are made without replacement. The prob. that the first draw will produce 3 white ball and second 3 red balls is :
- 6/255
 - 5/548
 - 7/429
 - 3/233

MTP June 24 Series III

- (43) If two events A and B are independent, the probability that both will occur is given by
- $P(A) \times P(B)$
 - $P(A) + P(B)$
 - $P(A) + P(B) - P(A \cup B)$
 - $P(A) + P(B) - P(A \cap B)$

MTP Sep 24 Series II

- (44) If $P(A) = 1/2$, $P(B) = 1/3$ and $P(A \cap B) = 1/4$, what is $P(A' \cap B')$?
- 1/2
 - 7/8
 - 5/8
 - 2/3

Answer Key

- | | | |
|------|------|------|
| 1 a | 2 c | 3 b |
| 4 c | 5 a | 6 a |
| 7 c | 8 b | 9 b |
| 10 d | 11 a | 12 d |
| 13 a | 14 c | 15 b |
| 16 c | 17 b | 18 d |
| 19 c | 20 d | 21 d |
| 22 c | 23 c | 24 d |
| 25 b | 26 a | 27 b |
| 28 a | 29 b | 30 a |
| 31 a | 32 d | 33 b |
| 34 c | 35 c | 36 d |
| 37 c | 38 b | 39 b |
| 40 b | 41 b | 42 c |
| 43 a | 44 c | |

Random Variable

Past Year Exam Questions

- (1) Variance of a random variable x is given by
- $E(X - \mu)^2$
 - $E[X - E(X)]^2$
 - $E(X^2 - \mu)$
 - (a) or (b)

- (2) If two random variables x and y are related by $y = 2 - 3x$, then the SD of y is
- $-3 \times \text{SD of } x$
 - $3 \times \text{SD of } x$
 - $9 \times \text{SD of } x$
 - $2 \times \text{SD of } x$

- (3) If $y \geq x$ then mathematical expectation is
- $E(X) > E(Y)$
 - $E(X) \leq E(Y)$
 - $E(X) = E(Y)$
 - $E(X) \cdot E(Y) = 1$

- (4) The value of K for the probability density function of a variate X is equal to:

X	P(x)
0	5k
1	3k
2	4k
3	6k
4	7k
5	9k
6	11k

- 39
- $\frac{1}{40}$
- $\frac{1}{49}$
- $\frac{1}{45}$

- (5) Assume that the probability for rain on a day is 0.4. An umbrella salesman can earn ₹ 400 per day in case of rain on that day and will lose ₹ 100 per day if there is no rain. The expected earnings (in ₹) per day of the salesman is
- 400
 - 200
 - 100
 - 0

PYQ Dec. 21

- (6) The probability distribution of a random variable x is given below:

X	P
1	0.15
2	0.25
4	0.2
5	0.3
6	0.1

What is the standard deviation of x ?

- a. 1.49 b. 1.56
c. 1.69 d. 1.72

PYQ Dec. 21

- (7) For a probability distribution, probability is given

by, $P(x_i) = \frac{x_i}{k}, x_i = 1, 2, \dots, 9$. The value of k is

- a. 55 b. 9
c. 45 d. 81

PYQ Dec. 21

- (8) If two dice are rolled and one of the dice shows 1

at a point then how many such outcome can be done where it is known that its probability is $x/36$ where $x =$ _____.

- a. 11 b. 7
c. 8 d. 9

PYQ Jun 23

- (9) The probability distribution of x is given below:

Value of x :	Probability:
1	p
0	$1-p$
Total	1

Mean is equal to

- a. p b. $1-p$
c. 0 d. 1

PYQ Jun 23

- (10) If a random variable X has the following probability distribution, then the expected value of X is:

-1	-2	0	1	2
1/3	1/6	1/5	1/6	1/3

- a. 3/2 b. 1/2
c. 1/6 d. 1/3

PYQ Jun 23

- (11) On a commodity exchange when booking trades with provision for stop-losses, a trader can make a profit of ₹ 50,000 or incur a loss of ₹ 20,000. The probabilities of making profit and incurring loss,

from the past experience, are known to be 0.75 and 0.25 respectively. The expected profit to be made by trader should be

- a. ₹ 32,500 b. ₹ 35,000
c. ₹ 30,000 d. ₹ 40,000

PYQ June 24

- (12) A random variable has the following probability distribution:

X	P
2	K
3	2K
5	2K

Find K.

- a. 1/3 b. 2/5
c. 1/5 d. 2/3

PYQ June 24

- (13) The following table gives the cumulative probability function of X :

X:	Pr(X):
0	6/30
1	5/30
2	13/30
3	1/15
4	1/10
5	1/30

The expectation of X is _____

- a. 1.8 b. 1.7
c. 1.5 d. 1.6

Answer Key

- | | | |
|------|------|------|
| 1 d | 2 b | 3 b |
| 4 d | 5 c | 6 c |
| 7 c | 8 a | 9 a |
| 10 c | 11 a | 12 C |
| 13 a | | |

Random Variable

Mock Test Paper Questions

MTP May 18

- (1)
- | | | | | | |
|--------|------|-----|-----|------|------|
| x | -20 | -10 | 30 | 75 | 80 |
| $P(x)$ | 3/20 | 1/5 | 1/2 | 1/10 | 1/20 |
- Find the Expected value of follow. distribution
- a. 20.5 b. 21.5
c. 22.5 d. 24.5

- (2) Variance of a random variable x is given by
- a. $E(x - \mu)^2$ b. $E[x - E(x)]^2$
 c. $E(x^2 - \mu)$ d. A or B

MTP May 19

- (3) If a random variable x assumes the values $x_1, x_2, x_3, x_4, \dots$ with corresponding probabilities, $p_1, p_2, p_3, p_4, \dots$ then the expected value of x is
- a. $p_1 + p_2 + p_3 + p_4$
 b. $x_1 p_1 + x_2 p_2 + x_3 p_3 + x_4 p_4$
 c. $x_1 p_1 + x_2 p_2 + x_3 p_3 + x_4 p_4$
 d. None

MTP Nov 19

- (4) Let X be a random variable with the following distribution

x	-2	4	8
$P(x)$	1/6	1/3	1/2

Find expected value of the random variable

- a. 5 b. 6
 c. 7 d. 8

MTP May 20

- (5) In a business venture, a man can make a profit of ₹ 50,000 or incur a loss of ₹ 20,000. The probabilities of making profit or incurring loss, from the past experience, are known to be 0.75 and 0.25 respectively. What is his expected profit?
- a. ₹ 33,500 b. ₹ 34,500
 c. ₹ 35,500 d. ₹ 32,500

MTP Apr 21

- (6) From the following probability distribution table, find $E(x)$.

X	1	2	3
$F(x)$	1/2	1/3	1/6

- a. 1 b. 1.50
 c. 1.67 d. None of these

MTP Nov 21

- (7) If X and Y are two random variables and if $E(X) = 3$ and $E(Y) = 6$, then $E(XY) = ?$
- a. 3 b. 6
 c. 18 d. 24

MTP Nov 21

- (8) Probability distribution may be
- a. Discrete b. Continuous
 c. Infinite d. (a) or (b)

MTP Nov 21

- (9) The probability distribution of the demand for a commodity is given below

X	5	6	7	8	9	10
$P(X)$	0.05	0.10	0.30	0.40	0.10	0.05

Expected value of demand will be

- a. 7.55 b. 7.85
 c. 1.25 d. 8.35

MTP Nov 21

- (10) An unbiased coin is tossed 6 times. Find the probability that the tosses result in heads only,
- a. 1/64 b. 5/64
 c. 10/64 d. None of these

MTP Oct 21

- (11) A bag contains 6 white and 4 red balls. If a person draws 2 balls and receives ₹ 10 and ₹ 20 for a white and red balls respectively, then his expected amount is
- a. ₹25 b. ₹26
 c. ₹29 d. ₹28

MTP March 22

- (12) For a probability of a random variable x is given below:

X	1	2	4	5	6
Y	0.15	0.25	0.2	0.3	0.1

What is the Standard deviation of x ?

- a. 1.49 b. 1.56
 c. 1.69 d. 1.72

MTP March 22

- (13) If $2x + 3y + 4 = 0$ and $V(x) = 6$ then $V(y)$ is
- a. 8/3 b. 9
 c. 9 d. 6

MTP March 22

- (14) Four unbiased coins are tossed simultaneously. The expected number of heads is:

X :	0	1	2	3	4
$P(x)$	1/16	4/16	6/16	4/16	1/16

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

MTP March 22

- (15) Assume that the probability for rain on a day is 0.4. An umbrella salesman can earn ₹400 per day in case of rain on that day will lose ₹100 per day if there is no rain. The expected earnings (in ₹) per day of the salesman is
- a. 400 b. 200
 c. 100 d. 0

MTP June 22

- (16) From the following probability distribution table, find $E(x)$

$x:$	1	2	3
$f(x):$	$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{6}$

- a. 1 b. 1.50
c. 1.67 d. None of these

MTP Dec 2023 Series I

- (17) A dice is rolled thrice, if getting a four is considered a success, find the variance of the probability distribution of number of successes

- a. $\frac{1}{2}$ b. $\frac{1}{4}$
c. $\frac{5}{12}$ d. $\frac{7}{12}$

MTP June 24 Series II

- (18) From the following probability distribution table, find $E(x)$.

$x:$	1	2	3
$f(x):$	$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{6}$

- a. 1 b. 1.50
c. 1.67 d. None of these

MTP June 24 Series II

- (19) If X and Y are two random variables then $v(x+y)$ is

- a. $v(x) + v(y)$
b. $v(x) + v(y) - 2v(x, y)$
c. $v(x) + v(y) + 2v(x, y)$
d. $v(x) - v(y)$

MTP June 24 Series II

- (20) Daily demand for calculators is having the following probability distribution:

Demand	Probability:
1	0.10
2	0.15
3	0.20
4	0.25
5	0.18
6	0.12

Determine the variance of the demand.

- a. 2.54 b. 2.93
c. 2.22 d. 2.19

MTP June 24 Series III

- (21) Find the Expected value of the following distribution

x	$P(x)$
-20	$\frac{3}{20}$
-10	$\frac{1}{5}$
30	$\frac{1}{2}$
75	$\frac{1}{10}$
80	$\frac{1}{20}$

- a. 20.5
b. 21.5
c. 22.5
d. 24.5

MTP Sep 24 Series I

- (22) A random variable has the following probability distribution:

X	P
2	K
3	$2K$
5	$2K$

Find K

- a. $\frac{1}{3}$ b. $\frac{2}{5}$
c. $\frac{1}{5}$ d. $\frac{2}{3}$

MTP Sep 24 Series II

- (23) If two random variables x and y are related by $y = 2 - 3x$, then the SD of y is given by

- a. $-3 \times \text{SD of } x$ b. $3 \times \text{SD of } x$
c. $9 \times \text{SD of } x$ d. $2 \times \text{SD of } x$

MTP Sep 24 Series II

- (24) If x and y are random variables having expected values as 4.5 and 2.5 respectively, then the expected value of $(x-y)$ is

- a. 2 b. 7
c. 6 d. 0

Answer Key

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