PROBABILITY
LEVEL-I

1. From a group of 10 persons consisting of 5 lawyers, 3 doctors and 2 engineers, four persons are selected at random. The probability that the selection contains at least one of each category is
(A) 1/2 (B) 2/3
(C) 2/3 (D) none of these

2. If one ball is drawn at random from each of the three boxes containing 3 white and 1 black, 2 white and 2 black, 1 white and 3 black balls then the probability that 2 white and 1 black balls will be drawn is
(A) 13/32 (B) 1/4
(C) 1/32 (D) 3/16

3. The probability of occurrence of a multiple of 2 on a dice and a multiple of 3 on the other dice of both are thrown together is
(A) 7/26 (B) 1/32
(C) 11/36 (D) 1/4

4. A fair coin is tossed repeatedly. If the tail appears on first four tosses, then the probability of the head appearing on the fifth toss equals
(A) 31/32 (B) 1/32
(C) 1/2 (D) 1/5

5. Let A and B be two independent events such that their probabilities are 3/10 and 2/5. The probability of exactly one of the events happening is
(A) 23/50 (B) 1/2
(C) 31/50 (D) none of these

6. A second-order determinant is written down using the numbers 1, –1 as elements. Then the probability for which determinant is non-zero is
(A) 3/8 (B) 5/8
(C) 1/8 (D) 1/2

7. There are 7 seats in a row. Three persons take seats at random. The probability that the middle seat is always occupieace and no two persons are consecutive is
(A) 9/70 (B) 9/35
(C) 4/35 (D) none of these

8. A, B, C are three events for which P (A) = 0.6, P (B) = 0.4, P (C) = 0.5, P ($A \cup B$) = 0.8, P ($A \cap C$) = 0.3 and P ($A \cap B \cap C$) = 0.2. If P ($A \cup B \cup C$) $\geq$ 0.85, then the interval of values of P ($B \cap C$) is
(A) [0.2, 0.35] (B) [0.55, 0.7] (C) [0.2, 0.55] (D) none of these

9. The probability that at least one of the events A and B occurs is 0.6. If A and B occur simultaneously with probability 0.2, then P($\overline{A}$) + P($\overline{B}$) is
(A) 0.4 (B) 0.8 (C) 1.2 (D) 1.4

10. A fair die is thrown until a score of less than 5 points is obtained. The probability of obtaining not less than 2 points on the last thrown is
(A) 3/4 (B) 5/6 (C) 4/5 (D) 1/3

11. Let 'E' and 'F' be two independent events. The probability that both 'E' and 'F' happen is 1/12 and the probability that neither 'E' nor 'F' happens is 1/2, then ,
(A) P(E) = 1/3, P(F) = 1/4 (B) P(E) = 1/2, P(F) = 1/6

(C) P(E) = 1/6, P(F) = 1/2 (D) P(E) = 1/4, P(F) = 1/3

12. A die is thrown three times and the sum of three numbers obtained is 15. The probability of first throw being 4 is

(A) $\frac{1}{18}$ (B) $\frac{1}{5}$ (C) $\frac{4}{5}$ (D) $\frac{17}{18}$

13. The probability that a shooter will hit a target is give as $\frac{1}{5}$. Then the probability of atleast one hit in 10 shots is

(A) $\frac{1}{5^{10}}$ (B) $1-\left(\frac{4}{5}\right)^{10}$ (C) $1-\frac{1}{5^{10}}$ (D) $\left(\frac{4}{5}\right)^{10}$

14. There are 4 envelopes with addresses and 4 concerning letters. The probability that letter does not go into concerning proper envelope, is or
There are four letters and four addressed envelopes. The chance that all letters are not dispatched in the right envelope is

(A) $\frac{19}{24}$ (B) $\frac{21}{23}$ (C) $\frac{23}{24}$ (D) $\frac{1}{24}$

15. Three identical dice are rolled. The probability of that the same number will appear on each of them is

(A) $\frac{1}{6}$ (B) $\frac{1}{36}$ (C) $\frac{1}{18}$ (D) $\frac{3}{28}$

16. In a box containing 100 bulbs, 10 are defective. What is the probability that out of a sample of 5 bulbs, none is defective.

(A) 10^{-5} (B) $\left(\frac{1}{2}\right)^5$ (C) $\left(\frac{9}{10}\right)^5$ (D) $\frac{9}{10}$

17. A pair of dice is thrown and the numbers appearing have sum greater than or equal to 10. The probability of getting sum 10 is

(A) $\frac{1}{6}$ (B) $\frac{1}{4}$ (C) $\frac{1}{3}$ (D) $\frac{1}{2}$

18. If P(A) = $\frac{2}{3}$, P(B) = $\frac{1}{2}$ and P(A$\cup$B) = $\frac{5}{6}$ then the events A and B are

(A) mutually exclusive (B) independent
(C) independent and mutually exclusive (D) none of these

19. In a given race the odds in favour of four horses A, B, C,D are 1:3, 1:4, 1:5,1:6 respectively. Assuming that a dead heat is impossible, find the chance that one of them wins the race.

(A) $\frac{319}{420}$ (B) $\frac{219}{420}$ (D) $\frac{319}{400}$ (D) none of these

20. A number is chosen at random from the numbers 10 to 99. By seeing the number a man will laugh if product of the digits is 12. If he choose three numbers with replacement then the probability that he will laugh at least once is

(A) $1-\left(\frac{3}{5}\right)^3$ (B) $\left(\frac{43}{45}\right)^3$

(C) $1 - \left(\frac{4}{25}\right)^3$ (D) $1 - \left(\frac{43}{45}\right)^3$

21. If $\frac{1+3p}{3}, \frac{1-p}{4}$ and $\frac{1-2p}{6}$ are the probabilities of three mutually exclusive events, then the set of all value of p is

(A) $\left(\frac{1}{3}, \frac{1}{2}\right)$ (B) $\left[\frac{1}{3}, \frac{1}{2}\right]$ (C) $\left[\frac{1}{3}, \frac{5}{6}\right]$ (D) none of these

22. One hundred identical coins, each with probability p, of showing up heads are tossed. If $0 < p < 1$ and the probability of heads showing on 50 coins is equal to that of the heads showing in 51 coins, then value of p is

(A) $\frac{1}{2}$ (B) $\frac{49}{101}$ (B) $\frac{50}{101}$ (D) $\frac{52}{101}$

23. A fair dice is tossed until a number greater than 4 appears. The probability that an even number of tosses shall be required is

(A) $\frac{1}{2}$ (B) $\frac{3}{5}$ (C) $\frac{1}{5}$ (D) $\frac{2}{3}$

24. There are four machines and it is known that exactly two of them are faulty. There are tested one by one, in a random order till both the faulty machine's are identified. Then the probability that only two tests are needed is

(A) $\frac{1}{3}$ (B) $\frac{1}{6}$ (C) $\frac{1}{2}$ (D) $\frac{1}{4}$

25. If the integers m and n are chosen at random between 1 and 100. Then the probability that a number of form $7^m + 7^n$ is divisible by 5 equals

(A) $\frac{1}{4}$ (B) $\frac{1}{7}$ (C) $\frac{1}{8}$ (D) $\frac{1}{49}$

LEVEL-II

1. All the spades are taken out from a pack of cards. From these cards, cards are drawn one by one with out replacement till the ace of spades comes. The probability that the ace comes in the 4^{th} draw is

(A) 1/13 (B) 12/13
(C) 4/13 (D) none of these

2. 8 coins are tossed simultaneously. The chance that head appears at least five of them is

(A) ${}^8C_5$ (B) ${}^8C_5\left(\frac{1}{2}\right)^8$ (C) $\frac{93}{256}$ (D) none of these

3. A number of six digits is written down at random. Probability that sum of digits of the number is even is

(A)1/2 (B) 3/8 (C) 3/7 (D) none of these

4. Fifteen coupons are numbered 1, 2, 3, - - - 15. Seven coupons are selected at random one at a time with replacement. The probability that the largest number appearing on the selected coupon is 9, is

(A) $\left(\frac{9}{16}\right)^6$ (B) $\left(\frac{8}{15}\right)^7$ (C) $\left(\frac{3}{5}\right)^7$ (D) none of these

5. A bag contains three white, two black and four red balls. If four balls are drawn at random with replacement, the probability that the sample contains just one white ball is;
(A) $(2/3)^4$ (B) 32/81 (C) $(1/3)^4$ (D) none of these.

6. A purse contains 4 copper coins, 3 silver coins, the second purse contains 6 copper coins and 2 silver coins. A coin is taken out of any purse, the probability that it is a copper coin is
(A) 4/7 (B) 3/4 (C) 3/7 (D) 37/56

7. Three numbers are chosen at random without replacement from the set A = {x| $1 \leq 10$, $x \in N$}. The probability that the minimum of the chosen numbers is 3 and maximum is 7, is
(A) $\frac{1}{12}$ (B) $\frac{1}{15}$ (C) $\frac{1}{40}$ (D) None of these

8. Two distinct numbers are selects from the numbers 1, 2, 3, .. . , 9. Then probability that their product is a perfect square is
(A) 2/9 (B) 4/9 (C) 1/9 (D) none of these

9. A student appears for test I, II and III. The student is successful if he passes either in test I, II or I, III. The probability of the student passing in test I, II and III are respectively p. q and 1/2. If the probability of the student to be successful is 1/2 then
(A) p = q = 1 (B) p = q = 1/2 (C) p = 1, q = 0 (D) p = 1, q = 1/2

10. Two small squares on a chess board are chosen at random. Probability that they have a common side is,
(A) 1/3 (B) 1/9 (C) 1/18 (D) none of these

11. A fair coin is tossed a fixed number of times . If the probability of getting 7 heads is equal to getting 9 heads, then the probability of getting 2 heads is,
(A) $15/2^8$ (B) 2/15 (C) $15/2^{13}$ (D) none of these

12. A fair die is tossed eight times. Probability that on the eighth throw a third six is observed is,
(A) ${}^8C_3 \frac{5^5}{6^8}$ (B) $\frac{{}^7C_2.5^5}{6^8}$ (C) $\frac{{}^7C_2.5^5}{6^7}$ (D) none of these

13. There are n persons ($n \geq 3$), among whom are A and B, who are made to stand in a row in random order. Probability that there is exactly one person between A and B is
(A) $\frac{n-2}{n(n-1)}$ (B) $\frac{2(n-2)}{n(n-1)}$ (C) 2/n (D) none of these

14. If the papers of 4 students can be checked by any one of the 7 teachers, then the probability that all the 4papers are checked by exactly 2 teachers is;
(A) 2/ 7 (B) 32/ 343 (C) 6/49 (D) None of these

15. If 'head' means one and 'tail' means two , then coefficient of quadratic equation $ax^2 + bx + c = 0$ are chosen by tossing three fair coins. The probability that roots of the equations are imaginary is
(A) 5/8 (B) 3/8 (C) 7/8 (D) 1/8

16. In a bag there are 15 red and 5 white balls. Two balls are chosen at random and one is found to be red. The probability that the second one is also red is
(A) 12/19 (B) 13/19 (C) 14/19 (D) 15/19

17. Pair of dice is rolled together till a sum of either 5 or 7 is obtained. Then the probability that 5 comes before 7 is

(A) $\frac{1}{9}$ (B) $\frac{1}{6}$ (C) $\frac{2}{5}$ (D) none of these

18. A determinant is chosen at random the set of all determinants of order 2 with elements 0 or 1 only. Then the probability that the value of the determinant chosen is positive is

(A) $\frac{1}{16}$ (B) $\frac{3}{16}$ (C) $\frac{5}{16}$ (D) $\frac{7}{16}$

LEVEL-III

1. Three of the six vertices of a regular hexagon are chosen at random. The probability that the triangle with three vertices is equilateral equals to

(A) $\frac{1}{2}$ (B) $\frac{1}{5}$ (C) $\frac{1}{10}$ (D) $\frac{1}{20}$

2. A and B play a game of tennis. The situation of the game is as follows; if one scores two consecutive points after a deuce he wins; if loss of a point is followed by win of a point, it is deuce. The chance of a server to win a point is 2/3. The game is at deuce and A is serving. Probability that A will win the match is, (serves are changed after each game)

(A) 3/5 (B) 2/5 (C) 1/2 (D) 4/5

3. Six different balls are put in three different boxes, no box being empty. The probability of putting balls in the boxes in equal numbers is,

(A) 3/10 (B) 1/6 (C) 1/5 (D) none of these

4. Three persons A_1, A_2 and A_3 are to speak at a function along with 5 other persons. If the person speak in random order, the probability that A_1 speaks before A_2 and A_2 speaks before A_3 is'

(A) 1/6 (B) 3/5 (C) 3/8 (D) none of these

ANSWERS

LEVEL −I

1.	A	2.	A	3.	C	4.	C
5.	A	6.		7.	D	8.	A
9.	C	10.	A	11.	A	12.	B
13.	B	14.	A	15.	B	16.	C
17.	D	18.	B	19.	A	20.	D
21.		22.		23.		24.	B
25.							

LEVEL −II

1.	A	2.	C	3.	A	4.	D
5.	B	6.	D	7.	C	8.	C
9.	C	10.	C	11.	C	12.	B
13.	B	14.	C	15.	C	16.	C

17. C 18. B

LEVEL −III

1. C 2. C 3. B 4. A