

MISSION NDA MATHEMATICS

COMPLETE TOPICWISE QUESTIONS

PROBABILITY THEORY

1. An urn contains 9 red, 7 white and 4 black balls. Out of them, one ball is drawn at random. The probability that the ball drawn will be a red or black is
(a) $9/20$ (b) $7/20$
(c) $11/20$ (d) $13/20$
2. A speaks truth 3 times out of 4 while B, 7 times out of 10. A ball is drawn at random from a bag containing one black ball and five other balls of different colours. Both A and B report that a black ball has been drawn from the bag. Find the probability of their assertion being true.
(a) $7/12$ (b) $5/12$
(c) $3/12$ (d) $9/12$
3. In a purse there are 9 five-paise coins and 1 one-rupee coin. In another purse there are all 10 five-paise coins. Nine coins are taken from the former and put into the second and then 9 coins are taken from the latter and put into the first. What is the chance that the one-rupee coin is still in the first purse?
(a) $1/9$ (b) $10/19$
(c) $5/19$ (d) none of these
4. An urn contains 6 white and 4 black balls. A fair die is rolled and that number of balls are chosen from the urn. The probability that the balls selected are white is
(a) $1/5$ (b) $1/6$
(c) $1/7$ (d) $1/8$
5. Two numbers a and b are chosen at random from the set of the first 30 natural numbers. The probability that $a^2 - b^2$ is divisible by 3 is
(a) $9/87$ (b) $12/87$
(c) $15/87$ (d) $47/87$
6. The probabilities of solving a problem by three students A, B and C are $\frac{1}{2}$, $\frac{1}{3}$ and $\frac{1}{4}$ respectively. The probability that the problem will be solved is
(a) $\frac{1}{4}$ (b) $\frac{1}{2}$
(c) $\frac{3}{4}$ (d) $\frac{1}{3}$
7. The probability of India winning a test match against West Indies is $1/2$. Assuming independence from match to match, the probability that in a five-match series, India's second win occurs at the third test is
(a) $1/8$ (b) $1/4$
(c) $1/2$ (d) $2/3$
8. A lot contains 20 articles. The probability that the lot contains exactly 2 defective articles is 0.4 and the probability that the lot contains exactly 3 defective articles is 0.6. Articles are drawn



from the lot at random one by one without replacement and tested till all the defective articles are found. What is the probability that the testing procedure ends at the 12th testing?

- (a) $89/1900$ (b) $99/1900$
(c) $78/1900$ (d) $59/1900$

9. 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) ${}^5C_4 \left(\frac{4}{5}\right)^4 \frac{1}{5}$ (b) $\left(\frac{4}{5}\right)^4 \frac{1}{5}$
(c) ${}^5C_1 \frac{1}{5} \left(\frac{4}{5}\right)^4$ (d) none of these

10. One of 10 keys opens the door. If we try the keys one after another, then which of the following is wrong?

- (a) The probability that the door is opened on the first attempt is $1/10$
(b) The probability that the door is opened on the second attempt is $1/10$
(c) The probability that the door is opened on the tenth attempt is $1/10$
(d) none of these

11. The probability that when 12 balls are distributed among three boxes, the first will contain three balls is

- (a) $\frac{2^9}{3^{12}}$ (b) $\frac{{}^{12}C_3 \cdot 2^9}{3^{12}}$
(c) $\frac{{}^{12}C_3 \cdot 2^{12}}{3^{12}}$ (d) none of these

12. The probability that certain electronic component fails when used for the first time is 0.10 . If it does not fail immediately, the probability that it lasts for one year is 0.99 . The probability that a new component will last for one year is

- (a) 0.9 (b) 0.1
(c) 0.119 (d) 0.891

13. A die and two coins are tossed. The probability that both the coins show heads and the die shows 1 or 2 is

- (a) $7/12$ (b) $4/7$
(c) $1/12$ (d) none of these

14. A fair coin is tossed 100 times. The probability of getting tails 1,3, ...,49 times is

- (a) $\frac{1}{2}$ (b) $\frac{1}{4}$
(c) $\frac{1}{8}$ (d) $\frac{1}{16}$

15. There are two groups of bags. The first group has four bags each containing 6 white and 3 black balls and the second group has three bags each containing 2 white and 4 black balls. From these groups, one bag is selected at random and a ball is drawn from it which is found to be black. The probability of it coming from a bag belonging to the first group is

- (a) $1/5$ (b) $2/5$
(c) $3/5$ (d) $2/3$

16. In a college, 25% of the boys and 10% of the girls are offered mathematics. The girls constitute 60% of the total number of students. If a student is selected at random and is found to be studying mathematics, the probability that the student is a girl is

- (a) $1/6$ (b) $3/8$
(c) $5/8$ (d) $5/6$



17. Three ships A, B and C sail from England to India. If the ratio of their arriving safely are 2: 5, 3: 7 and 6: 11 respectively, then the probability of all the ships for arriving safely is
 (a) $18/595$ (b) $6/17$
 (c) $3/10$ (d) $2/7$
18. A student appears for tests I, II and III. The student is successful if he passes in either tests I and II or tests I and III. The probabilities of the student passing in tests I, II and III are respectively, p, q and $1/2$. If the probability that the student is successful is $1/2$, then $p(1 + q) =$
 (a) $\frac{1}{2}$ (b) 1
 (c) $3/2$ (d) $3/4$
19. A symmetrical coin is tossed three times. Let A and B be the two events such that
 A : First throw is a head
 B : Last throw is a tail. Then
 (a) A and B are mutually exclusive and independent
 (b) A and B are neither mutually exclusive nor independent
 (c) A and B are mutually exclusive but not independent
 (d) A and B are independent but not mutually exclusive
20. There are 5 address envelopes. Letters are written to corresponding persons but the letters are placed at random in envelopes. The probability that none of the letters enters into the correct envelope is
 (a) $1/5!$ (b) $11/120$
 (c) $11/30$ (d) none of these
21. If birth to a male child and birth to a female child are equal-probable, then what is the probability that at least one of the three children born to a couple is a male?
 (a) $4/5$ (b) $7/8$
 (c) $8/7$ (d) $1/2$
22. A box contains 10 good articles and 6 with defects. If one article is taken out at random, what is the probability that it is either good or has a defect?
 (a) $64/64$ (b) $48/64$
 (c) $36/64$ (d) $24/64$
23. If two events A and B are such that $P(A') = 0.3, P(B) = 0.4, P(A \cap B') = 0.5$, then $P(B/A \cap B') =$
 (a) 0.20 (b) 0.25
 (c) 0.30 (d) 0.35
24. One hundred cards are numbered from 1 to 100. The probability that a randomly chosen card has a digit 5 is
 (a) $1/100$ (b) $9/100$
 (c) $19/100$ (d) none of these
25. Three dice are thrown simultaneously. The probability of getting a sum of 15 is
 (a) $5/108$ (b) $1/72$
 (c) $5/72$ (d) $5/36$
26. A bag contains 5 white and 3 black balls and 4 balls are successively drawn out and not replaced. The probability that they are alternately of different colours is
 (a) $1/196$ (b) $2/7$
 (c) $13/56$ (d) $1/7$



27. Of the cigarette smoking population, 70% are men and 30% are women. 10% of the men and 20% of the women smoke Wills, then the probability that a person smoking a Wills to be a male is
- (a) $1/5$ (b) $7/13$
(c) $5/13$ (d) $7/10$
28. A and B are two independent witnesses (i.e. there is no collusion between them) in a case. The probability that A will speak the truth is x and the probability that B will speak the truth is y . A and B agree in a certain statement. The probability that the statement is true is
- (a) $\frac{x-y}{x+y}$ (b) $\frac{xy}{1+x+y+xy}$
(c) $\frac{x-y}{1-x-y+2xy}$ (d) $\frac{xy}{1-x-y+2xy}$
29. A car is parked by a driver amongst 25 cars in a row, not at either end. When he returns he finds that 10 places are empty. The probability that both the neighbouring places of the driver's car are vacant is
- (a) $9/92$ (b) $15/92$
(c) $21/92$ (d) $27/92$
30. The probability that out of 5 persons, all having birthday in March, at least two have the same birthday is
- (a) $\frac{{}^{31}C_5}{(31)^5}$ (b) $\frac{(31)^5 - {}^{31}C_5}{(31)^5}$
(c) $\frac{(31)^3 \times {}^{31}C_2}{(31)^5}$ (d) none of these
31. What is the probability that when one die is thrown, the number appearing on top is even?
- (a) $1/6$ (b) $1/3$
(c) $1/2$ (d) none of these
32. A bag contains 7 red and 2 black balls. Another bag contains 5 red and 3 black balls. If one ball is drawn from each bag, then the probability that the balls are red is
- (a) $24/35$ (b) $35/72$
(c) $45/72$ (d) $50/72$
33. A card is drawn from a pack of 52 cards. A gambler bets that it is a space or an ace. What are odds against his winning this bet?
- (a) 17: 52 (b) 52: 17
(c) 9: 4 (d) 4: 9
34. The probability of getting 10 in a single throw of three fair dice is
- (a) $1/6$ (b) $1/8$
(c) $1/9$ (d) none of these
35. A seven-digit number is formed by using 0,1,2,3,4, 8, 9 without repetition. Then the probability that it is divisible by 4 is
- (a) $\frac{53 \times 4!}{5 \times 6!}$ (b) $\frac{53}{180}$
(c) $\frac{53}{6 \times 6!}$ (d) none of these
36. Among 15 players, 8 are batsmen and 7 are bowlers. The probability that a team is chosen of 6 batsmen and 5 bowlers is



(a) $\frac{{}^8C_6 \times {}^7C_5}{{}^{15}C_{11}}$

(b) $\frac{{}^8C_6 + {}^7C_5}{{}^{15}C_{11}}$

(c) $\frac{15}{28}$

(d) none of these

37. The probability of getting at least one tail in 4 throws of a coin is

(a) $15/16$

(b) $1/16$

(c) $1/4$

(d) $1/8$

38. Two cards are drawn from a pack of 52 cards. What is the probability that one of them is a queen and the other is an ace?

(a) $2/663$

(b) $2/13$

(c) $4/663$

(d) $8/663$

39. Odds in favour of an event A are 2 to 1 and odds in favour of $A \cup B$ are 3 to 1. Consistent with this information, the smallest and largest values for the probability of event B are given by

(a) $\frac{1}{6} \leq P(B) \leq \frac{1}{3}$

(b) $\frac{1}{3} \leq P(B) \leq \frac{1}{2}$

(c) $\frac{1}{12} \leq P(B) \leq \frac{3}{4}$

(d) none of these

40. Among the divisors of 504, two are chosen randomly, then the probability that the divisors chosen are even is

(a) $3/4$

(b) $1/24$

(c) $1/18$

(d) $51/92$

41. A die is rolled three times. The probability of getting a larger number than the previous number each time is

(a) $\frac{15}{216}$

(b) $\frac{5}{54}$

(c) $\frac{13}{216}$

(d) $\frac{1}{18}$

42. Two dice are thrown. The probability that the sum of the points on the two dice will be 7 is

(a) $5/36$

(b) $1/6$

(c) $3/36$

(d) $2/9$

43. Two dice are thrown. The number of sample points in the sample space when six does not appear on any one side is

(a) 11

(b) 30

(c) 18

(d) 25

44. A coin is tossed 10 times. The probability that on the 10th throw it is observed 5th head is

(a) ${}^9C_5 \frac{1}{2^5}$

(b) $\frac{{}^9C_4}{2^{10}}$

(c) $\frac{{}^9C_5}{2^{10}}$

(d) none of these

45. Twenty-five coins are tossed simultaneously. The probability that the fifth coin will fall with head upwards is

(a) $\frac{5}{25}$

(b) $\frac{5}{2^{25}}$

(c) $\frac{1}{2}$

(d) none of these

46. The probability that Krishna will be alive 10 years hence is $7/15$ and the probability that Hari will be alive after 10 years is $7/10$. The probability that both Krishna and Hari will be alive 10 years hence is



- (a) $21/150$ (b) $24/150$
(c) $49/150$ (d) $56/150$
47. Two dice are thrown. What is the probability that the sum of the numbers appearing on the two dice is 11, if 5 appears on the first?
(a) $1/36$ (b) $1/6$
(c) $5/6$ (d) none of these
48. The probability that a teacher will give an unannounced test during any class meeting is $1/5$. If a student is absent twice, the probability that he will miss at least one test is
(a) $7/25$ (b) $9/25$
(c) $16/25$ (d) $24/25$
49. In a bag there are six balls of unknown colours; three balls are drawn at random and found to be all black. Find the probability that no black ball is left in the bag (or find the probability that the bag contains exactly three black balls).
(a) $1/35$ (b) $1/34$
(c) $1/40$ (d) $1/38$
50. 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 $P(\bar{A}) + P(\bar{B})$ is
(a) 0.4 (b) 0.8
(c) 1.2 (d) 1.4
51. In a lottery there were 90 tickets numbered 1 to 90. Five tickets were drawn at random. The probability that two of the tickets drawn were numbered 15 and 89 is
(a) $2/801$ (b) $2/623$
(c) $1/267$ (d) $1/623$
52. A six-faced die is so biased that it is twice as likely to show an even number as an odd number when thrown. It is thrown twice. The probability that the sum of two numbers thrown is even is
(a) $1/12$ (b) $1/6$
(c) $1/3$ (d) $5/9$
53. The probability that a 50-year-old man will be alive at 60 is 0.83 and the probability that a 45-year-old woman will be alive at 55 is 0.87 .
(1) The probability that both will be alive is 0.7221 .
(2) At least one of them will be alive is 0.9779 .
(a) Only (1) is true (b) Only (2) is true
(c) Both (1) and (2) are true (d) Both (1) and (2) are false
54. If two squares are chosen at random on a chess board, the probability that they have a side in common is
(a) $1/9$ (b) $1/18$
(c) $2/7$ (d) none of these
55. An unbiased die with faces marked 1, 2, 3, 4, 5 and 6 is rolled four times. Out of four face values obtained, the probability that the minimum face value is not less than 2 and the maximum face value is not greater than 5 is
(a) $16/81$ (b) $1/81$
(c) $80/81$ (d) $65/81$



ANSWER KEY

1	d	2	a	3	b	4	a	5	d	6	c	7	d
8	b	9	a	10	d	11	b	12	d	13	c	14	b
15	b	16	b	17	a	18	b	19	d	20	c	21	b
22	a	23	b	24	c	25	a	26	d	27	b	28	d
29	b	30	b	31	c	32	b	33	c	34	b	35	b
36	a	37	a	38	d	39	c	40	d	41	b	42	b
43	d	44	b	45	c	46	c	47	b	48	b	49	a
50	c	51	a	52	d	53	c	54	d	55	a		



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