# Assignment

## Definition of various terms

### Basic Level

**1.** Two coins are tossed. Let $A$ be the event that the first coin shows head and $B$ be the event that the second coin shows a tail. Two events $A$ and $B$ are

(a) Mutually exclusive (b) Dependent

(c) Independent and mutually exclusive (d) None of these

**2.** A card is drawn from a pack of 52 cards. If $A$ = card is of diamond, $B$ = card is an ace and $A \cap B$ = card is ace of diamond, then events $A$ and $B$ are

(a) Independent (b) Mutually exclusive (c) Dependent (d) Equally likely

**3.** The probabilities of three mutually exclusive events are $2/3$, 1/4 and 1/6. The statement is

(a) True (b) False (c) Could be either (d) Do not know

**4.** If $P(A_1 \cup A_2) = 1 - P(A_1^c)P(A_2^c)$, where c stands for complement, then the events $A_1$ and $A_2$ are

(a) Mutually exclusive (b) Independent (c) Equally likely (d) None of these

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

**[MNR 1992; Rajasthan PET 2000; UPSEAT 2000]**

(a) [0, 1] (b) $\left[-\frac{1}{4}, \frac{1}{3}\right]$ (c) $\left[0, \frac{1}{3}\right]$ (d) $(0, \infty)$

**6.** The event $A$ is independent of itself if and only if $P(A) =$

(a) 0 (b) 1 (c) 0, 1 (d) None of these

**7.** If $A$ and $B$ are independent events and $P(C) = 0$, then

(a) $A$ and $C$ are independent (b) $B$ and $C$ are independent

(c) $A$, $B$ and $C$ are independent (d) All of these

## Definition of Probability

### Basic Level

**8.** The probability that an ordinary or a non-leap year has 53 Sundays, is

(a) 2/7 (b) 1/7 (c) 3/7 (d) None of these

**9.** Three letters are to be sent to different persons and addresses on the three envelopes are also written. Without looking at the addresses, the probability that the letters go into the right envelope is equal to

(a) 1/27 (b) 1/9 (c) 4/27 (d) 1/6

**10.** The probability of getting head and tail alternately in three throws of a coin (or a throw of three coins), is

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

**11.** 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 numbers 15 and 89 is

(a) 2/801 (b) 2/623 (c) 1/267 (d) 1/623

**12.** Two numbers are selected randomly from the set $S = \{1, 2, 3, 4, 5, 6\}$ without replacement one by one. The probability that minimum of the two numbers is less than 4 is

(a) 1/15 (b) 14/15 (c) 1/5 (d) 4/5

**13.** Among 15 players, 8 are batsmen and 7 are bowlers. Find the probability that a team is chosen of 6 batsmen and 5 bowlers

**[UPSEAT 2002]**

(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

**14.** The probability of obtaining sum '8' in a single throw of two dice

(a) $\frac{1}{36}$ (b) $\frac{5}{36}$ (c) $\frac{4}{36}$ (d) $\frac{6}{36}$

**15.** Three mangoes and three apples are in a box. If two fruits are chosen at random, the probability that one is a mango and the other is an apple is

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

**16.** A card is drawn at random from a pack of 100 cards numbered 1 to 100. The probability of drawing a number which is a square is

**[EAMCET 1989]**

(a) $\frac{1}{5}$ (b) $\frac{2}{5}$ (c) $\frac{1}{10}$ (d) None of these

**17.** A bag contains 5 white, 7 black and 4 red balls. Three balls are drawn from the bag at random. The probability that all the three balls are white, is

(a) $\frac{3}{16}$ (b) $\frac{3}{5}$ (c) $\frac{1}{60}$ (d) $\frac{1}{56}$

**18.** Two dice are thrown together. The probability that at least one will show its digit 6 is

(a) $\frac{11}{36}$ (b) $\frac{36}{11}$ (c) $\frac{5}{11}$ (d) $\frac{1}{6}$

**19.** The sum of two positive numbers is 100. The probability that their product is greater than 1000 is

(a) 7/9 (b) 7/10 (c) 2/5 (d) None of these

**20.** Two integers are chosen at random and multiplied. The probability that the product is an even integer is

(a) 1/2 (b) 2/3 (c) 3/4 (d) 4/5

**21.** A pair of a dice thrown, if 5 appears on at least one of the dice, then the probability that the sum is 10 or greater is **[MP PET 2001]**

(a) $\frac{11}{36}$ (b) $\frac{2}{9}$ (c) $\frac{3}{11}$ (d) $\frac{1}{12}$

**22.** Four boys and three girls stand in a queue for an interview, probability that they will in alternate position is **[UPSEAT 2**

(a) 1/34 (b) 1/35 (c) 1/17 (d) 1/68

**23.** If two dice are thrown simultaneously then probability that 1 comes on first dice is **[Rajasthan PET 2002]**

(a) 1/36 (b) 5/36 (c) 1/6 (d) None of these

**24.** Out of 30 consecutive numbers, 2 are chosen at random. The probability that their sum is odd, is

(a) $\frac{14}{29}$ (b) $\frac{16}{29}$ (c) $\frac{15}{29}$ (d) $\frac{10}{29}$

**25.** Three integers are chosen at random from the first 20 integers. The probability that their product is even, is **[Kurukshe**

(a) $\frac{2}{19}$ (b) $\frac{3}{29}$ (c) $\frac{17}{19}$ (d) $\frac{4}{19}$

**26.** Two dice are thrown. The probability that the sum of the points on two dice will be 7, is **[IIT 1974; MNR 1981, 91; Rajasthan PET 1995, 97, 2002; UPSEAT 2000]**

(a) $\frac{5}{36}$ (b) $\frac{6}{36}$ (c) $\frac{7}{36}$ (d) $\frac{8}{36}$

**27.** A bag contains tickets numbered from 1 to 20. Two tickets are drawn. The probability that both the numbers are prime, is **[AISSE 1981]**

(a) $\frac{14}{95}$ (b) $\frac{7}{95}$ (c) $\frac{1}{95}$ (d) None of these

**28.** In a single throw of two dice, the probability of getting more than 7 is

(a) $\frac{7}{36}$ (b) $\frac{7}{12}$ (c) $\frac{5}{12}$ (d) $\frac{5}{36}$

**29.** If two balanced dice are tossed once, the probability of the event that the sum of the integers coming on the upper sides of the two dice is 9 is

(a) 7/18 (b) 5/36 (c) 1/9 (d) 1/6

**30.** The probability of getting number 5 in throwing a die is **[MP PET 1988]**

(a) 1 (b) 1/3 (c) 1/6 (d) 5/6

**31.** The probability of getting a number greater than 2 in throwing a die is

(a) 1/3 (b) 2/3 (c) 1/2 (d) 1/6

**32.** The chance of throwing at least 9 in a single throw with two dice, is

(a) $\frac{1}{18}$ (b) $\frac{5}{18}$ (c) $\frac{7}{18}$ (d) $\frac{11}{18}$

**33.** The probability that the three cards drawn from a pack of 52 cards are all red is **[MP PET 1999]**

(a) $\frac{1}{17}$ (b) $\frac{3}{19}$ (c) $\frac{2}{19}$ (d) $\frac{2}{17}$

**34.** The probability of getting a total of 5 or 6 in a single throw of 2 dice is

(a) 1/2 (b) 1/4 (c) 1/3 (d) 1/6

**35.** If a committee of 3 is to be chosen from a group of 38 people of which you are a member. What is the probability that you will be on the committee

(a) $\binom{38}{3}$ (b) $\binom{37}{2}$ (c) $\binom{37}{2}\Big/\binom{38}{3}$ (d) 666/8436

**36.** The chance of getting a doublet with 2 dice is **[Kurukshetra CEE 2002]**

(a) $\frac{2}{3}$ (b) $\frac{1}{6}$ (c) $\frac{5}{6}$ (d) $\frac{5}{36}$

**37.** A bag contains 3 white and 5 black balls. If one ball is drawn, then the probability that it is black, is

(a) $\frac{3}{8}$ (b) $\frac{5}{8}$ (c) $\frac{6}{8}$ (d) $\frac{10}{20}$

**38.** Two dice are thrown together. The probability that sum of the two numbers will be a multiple of 4 is

(a) 1/9 (b) 1/3 (c) 1/4 (d) 5/9

**39.** The probability of happening of an impossible event *i.e.,* $P(\phi)$ is

(a) 1 (b) 0 (c) 2 (d) – 1

**40.** For any event $A$ **[Rajasthan PET 1995]**

(a) $P(A)+P(\overline{A})=0$ (b) $P(A)+P(\overline{A})=1$ (c) $P(A)>1$ (d) $P(\overline{A})<1$

**41.** A bag contains 3 red, 4 white and 5 black balls. Three balls are drawn at random. The probability of being their different colours is **[Rajasthan PET 1999]**

(a) 3/11 (b) 2/11 (c) 8/11 (d) None of these

**42.** Find the probability that the two digit number formed by digits 1, 2, 3, 4, 5 is divisible by 4 (while repetition of digit is allowed)

**[UPSEAT 2002]**

(a) $\frac{1}{30}$ (b) $\frac{1}{20}$ (c) $\frac{1}{40}$ (d) None of these

**43.** If $P(A)=0.65, P(B)=0.15,$ then $P(\overline{A})+P(\overline{B})=$ **[Pb. CET 1989; EAMCET 1988]**

(a) 1.5 (b) 1.2 (c) 0.8 (d) None of these

**44.** If four persons are chosen at random from a group of 3 men, 2 women and 4 children. Then the probability that exactly two of them are children, is

**[Kurukshetra CEE 1996; DCE 1999]**

(a) 10/21 (b) 8/63 (c) 5/21 (d) 9/21

**45.** A single letter is selected at random from the word "PROBABILITY". The probability that the selected letter is a vowel is

**[MNR 1986; UPSEAT 2000]**

(a) 2/11 (b) 3/11 (c) 4/11 (d) 0

**46.** The probability of three persons having the same date and month for the birthday is

(a) 1/365 (b) $1/(365)^2$ (c) $1/(365)^3$ (d) None of these

**47.** Out of 20 consecutive positive integers, two are chosen at random, the probability that their sum is odd is

(a) 1/20 (b) 10/19 (c) 19/20 (d) 9/19

**48.** *A* and *B* play a game where each is asked to select a number from 1 to 25. If the two numbers match, both of them win a prize. The probability that they will not win a prize in a single trial is

(a) 1/25 (b) 24/25 (c) 2/25 (d) None of these

**49.** If $E$ and $F$ are events with $P(E)\le P(F)$ and $P(E\cap F)>0$ , then

(a) Occurrence of $E \Rightarrow$ occurrence of $F$ (b) Occurrence of $F \Rightarrow$ occurrence of $E$

(c) Non-occurrence of $E \Rightarrow$ non-occurrence of $F$ (d) None of the above implications holds

**50.** A single letter is selected form the word 'KURUKSHETRA UNIVERSITY' the probability that it is a vowel is **[Kurukshetra**

(a) 4/5 (b) 3/7 (c) 8/21 (d) 2/5

**51.** From the word 'POSSESSIVE', a letter is chosen at random. The probability of it to be *S* is

(a) $\frac{3}{10}$ (b) $\frac{4}{10}$ (c) $\frac{3}{6}$ (d) $\frac{4}{6}$

**52.** Out of 40 consecutive natural numbers, two are chosen at random. Probability that the sum of the numbers is odd, is

**[MP PET 2002]**

(a) $\frac{14}{29}$ (b) $\frac{20}{39}$ (c) $\frac{1}{2}$ (d) None of these

**53.** Two dice are tossed. The probability that the total score is a prime number is

(a) $\frac{1}{6}$ (b) $\frac{5}{12}$ (c) $\frac{1}{2}$ (d) None of these

**54.** A lot consists of 12 good pencils, 6 with minor defects and 2 with major defects. A pencil is choosen at random. The probability that this pencil is not defective is

(a) 3/5 (b) 3/10 (c) 4/5 (d) 1/2

**55.** 7 white balls and 3 black balls are placed in a row at random. The probability that no two black balls are adjacent is

(a) $\frac{1}{2}$ (b) $\frac{7}{15}$ (c) $\frac{2}{15}$ (d) $\frac{1}{3}$

**56.** Twenty children are standing in a line outside a ticket window at Appu Ghar in New Delhi. Ten of these children have a one-rupee coin each and the remaining 10 have a two-rupee coin each. The entry ticket is priced Re. 1. If all the arrangements of the 20 children are equally likely, the probability that the $10^{th}$ will be the first to wait for change is (Assume that the cashier has no change to begin with)

(a) $\frac{2^{10}}{^{20}C_{10}}$ (b) $\frac{^{20}C_{10}}{2^{10}}$ (c) 0 (d) None of these

**57.** 4 five-rupee coins, 3 two-rupee coins and 2 one-rupee coins are stacked together in a column at random. The probability that the coins of the same denomination are consecutive is

(a) $\frac{13}{9!}$ (b) $\frac{1}{210}$ (c) $\frac{1}{35}$ (d) None of these

**58.** 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

**59.** 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

**60.** If $m$ rupee coins and $n$ ten paise coins are placed in a line, then the probability that the extreme coins are ten paise coins is

(a) $^{m+n}C_m$ (b) $\frac{n(n-1)}{(m+n)(m+n-1)}$ (c) $^{m+n}P_m$ (d) $^{m+n}P_n$

**61.** Twelve balls are distributed among three boxes. The probability that the first box contains 3 balls is

(a) $\frac{110}{9}\left(\frac{2}{3}\right)^{10}$ (b) $\frac{9}{110}\left(\frac{2}{3}\right)^{10}$ (c) $\frac{^{12}C_3}{12^3}.2^9$ (d) $\frac{^{12}C_3}{3^{12}}$

**62.** Six boys and six girls sit in a row. What is the probability that the boys and girls sit alternately

(a) 1/462 (b) 1/924 (c) 1/2 (d) None of these

**63.** Word 'UNIVERSITY' is arranged randomly. Then the probability that both 'I' does not come together, is

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

**64.** A fair coin is tossed repeatedly. If tail appears on first four tosses, then the probability of head appearing on fifth toss equals **[IIT 1998]**

(a) 1/2 (b) 1/32 (c) 31/32 (d) 1/5

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

(a) $\frac{3}{16}$ (b) $\frac{3}{8}$ (c) $\frac{1}{4}$ (d) None of these

**66.** Out of 13 applicants for a job, there are 5 women and 8 men. It is desired to select 2 persons for the job. The probability that at least one of the selected persons will be a woman is

(a) 25/39 (b) 14/39 (c) 5/13 (d) 10/13

**67.** Two numbers are selected at random from 1, 2, 3.....100 and are multiplied, then the probability correct to two places of decimals that the product thus obtained is divisible by 3, is

(a) 0.55 (b) 0.44 (c) 0.22 (d) 0.33

**68.** Five digit numbers are formed using the digits 1, 2, 3, 4, 5, 6, and 8. What is the probability that they have even digits at both the ends **[Rajasthan PET 1999]**

(a) 2/7 (b) 3/7 (c) 4/7 (d) None of these

**69.** The corners of regular tetrahedrons are numbered 1, 2, 3, 4. Three tetrahedrons are tossed. The probability that the sum of upward corners will be 5 is

(a) 5/24 (b) 5/64 (c) 3/32 (d) 3/16

**70.** If four vertices of a regular octagon are chosen at random, then the probability that the quadrilateral formed by them is a rectangle is **[AMU 1999]**

(a) 1/8 (b) 2/21 (c) 1/32 (d) 1/35

**71.** In a college, 25% of the boys and 10% of the girls offer 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 **[MP PET 2001]**

(a) $\frac{1}{6}$ (b) $\frac{3}{8}$ (c) $\frac{5}{8}$ (d) $\frac{5}{6}$

**72.** There are $m$ persons sitting in a row. Two of them are selected at random. The probability that the two selected persons are not together, is

(a) $\frac{2}{m}$ (b) $1-\frac{2}{m}$ (c) $\frac{m(m-1)}{(m+1)(m+2)}$ (d) None of these

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

(a) $\frac{1}{4}$ (b) $\frac{1}{7}$ (c) $\frac{1}{8}$ (d) $\frac{1}{49}$

**74.** Cards are drawn one by one at random from a well shuffled full pack of 52 cards until two aces are obtained for the first time. If $N$ is the number of cards required to be drawn, then $P_r[N=n]$, where $2 \le n \le 50,$ is

(a) $\frac{(n-1)(52-n)(51-n)}{50\times 49\times 17\times 13}$ (b) $\frac{2(n-1)(52-n)(51-n)}{50\times 49\times 17\times 13}$ (c) $\frac{3(n-1)(52-n)(51-n)}{50\times 49\times 17\times 13}$ (d) $\frac{4(n-1)(52-n)(51-n)}{50\times 49\times 17\times 13}$

**75.** A locker can be opened by dialing a fixed three digit code (between 000 and 999). A stranger who does not know the code tries to open the locker by dialing three digits at random. The probability that the stranger succeeds at the $k^{th}$ trial is

(a) $\frac{k}{999}$ (b) $\frac{k}{1000}$ (c) $\frac{k-1}{1000}$ (d) None of these

**76.** Seven white balls and three black balls are randomly placed in a row. The probability that no two black balls are placed adjacently equals

(a) 1/2 (b) 7/15 (c) 2/15 (d) 1/3

**77.** A committee consists of 9 experts taken from three institutions *A, B* and *C*, of which 2 are from *A*, 3 from *B* and 4 from *C*. If three experts resign, then the probability that they belong to different institutions is

(a) $\frac{1}{729}$ (b) $\frac{1}{24}$ (c) $\frac{1}{21}$ (d) $\frac{2}{7}$

**78.** There are four machines and it is known that exactly two of them are faulty. They are tested, one by one, in a random order till both the faulty machines are identified. The probability that only two tests are needed is

(a) 1/3 (b) 1/6 (c) 1/2 (d) 1/4

**79.** A five digit number is formed by writing the digits 1, 2, 3, 4, 5 in a random order without repetitions. Then the probability that the number is divisible by 4 is

(a) 3/5 (b) 18/5 (c) 1/5 (d) 6/5

**80.** Five persons entered the lift cabin on the ground floor of an 8-floor house. Suppose that each of them independently and with equal probability can leave the cabin at any floor beginning with the first. The probability of all five persons leaving at different floors is

(a) $\frac{7^5}{{}^7P_5}$ (b) $\frac{{}^7P_5}{7^5}$ (c) $\frac{5!}{7^5}$ (d) 1

**81.** If $A$ and $B$ are two events than the value of the determinant choosen at random from all the determinants of order 2 with entries 0 or 1 only is positive or negative respectively. Then

(a) $P(A) \ge P(B)$ (b) $P(A) \le P(B)$ (c) $P(A)=P(B)=1/2$ (d) None of these

**82.** $x_1, x_2, x_3, \ldots\ldots x_{50}$ are fifty real numbers such that $x_r < x_{r+1}$ for $r = 1,2,3,\ldots\ldots,49$ . Five numbers out of these are picked up at random. The probability that the five numbers have $x_{20}$ as the middle number is

(a) $\frac{^{20}C_2 \times {}^{30}C_2}{^{50}C_5}$ (b) $\frac{^{30}C_2 \times {}^{19}C_2}{^{50}C_5}$ (c) $\frac{^{19}C_2 \times {}^{31}C_3}{^{50}C_5}$ (d) None of these

**83.** A card is drawn from a pack. The card is replaced and the pack is reshuffled. If this is done six times, the probability that 2 hearts, 2 diamonds and 2 black cards are drawn is

(a) $90.\left(\frac{1}{4}\right)^6$ (b) $\frac{45}{2}.\left(\frac{3}{4}\right)^4$ (c) $\frac{90}{2^{10}}$ (d) None of these

**84.** An even number of cards is drawn from a pack of 52 cards. The probability that half of these cards will be red and the other half black is

(a) $\frac{^{52}C_2}{2^{51}-1}$ (b) $\frac{^{52}C_{26}-1}{2^{51}-1}$ (c) $\frac{^{52}C_2-1}{2^{51}-1}$ (d) $\frac{^{52}C_2}{2^{51}+1}$

**85.** Two numbers *a* and *b* are chosen at random from the set {1, 2, 3,.....,3*n*} the probability that $a^2 - b^2$ is divisible by 3 is

(a) $\frac{5(n-3)}{3n-1}$ (b) $\frac{5(n+3)}{3n-1}$ (c) $\frac{5n-3}{3(3n-1)}$ (d) None of these

**86.** The probability that the birth days of six different persons will fall in exactly two calendar months is

(a) $\frac{1}{6}$ (b) $^{12}C_2 \times \frac{2^6}{12^6}$ (c) $^{12}C_2 \times \frac{2^6-1}{12^6}$ (d) $\frac{341}{12^5}$

**87.** A bag contains *n* white and *n* red balls. Pairs of balls are drawn without replacement until the bag is empty. The probability of each pair consisting of balls of different colours is

(a) $\frac{2^n}{^{2n}C_n}$ (b) $\frac{2^{n-1}}{^{2n}C_n}$ (c) $\frac{2^n}{^{2n-1}C_n}$ (d) 1

**88.** To avoid detection at customs, a traveller has placed six narcotic tablets in a bottle containing nine vitamin pills that are similar in appearance. If the customs official selects three of the tablets at random for analysis, the probability that traveller will be arrested for illegal possession of narcotics is

(a) $\frac{53}{63}$ (b) $\frac{53}{65}$ (c) $\frac{51}{65}$ (d) $\frac{13}{63}$

**89.** 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

**90.** A man and a woman appear in an interview for two vacancies in the same post. The probability of man's selection is 1/4 and that of woman's selection is 1/3. What is the probability that none of them will be selected

(a) 1/2 (b) 1/12 (c) 1/4 (d) None of these

**91.** Three six faced unbiased dice are thrown together. The probability that exactly two of the three numbers are equal is

(a) 117/216 (b) 5/12 (c) 165/216 (d) None of these

**92.** If the papers of 4 students can be checked by any one of the seven teachers, then the probability that all the four papers are checked by exactly two teachers is

(a) 2/7 (b) 12/49 (c) 32/343 (d) None of these

**93.** *m* boys and *m* girls take their seats randomly around a circle. The probability of their sitting is $(^{2m-1}C_m)^{-1}$ when

(a) No two boys sit together (b) No two girls sit together

(c) Boys and girls sit alternatively (d) All the boys sit together

**94.** *m* men and *w* women seat themselves at random on $m+w$ seats arranged in row (circle). If $p_1(p_2)$ denote the probability of all women sitting together when they are arranged in row (circle), then

(a) $p_1 = \frac{m+1}{{}^{m+w}C_m}$ (b) $p_1 + p_2 = \frac{2m+w+1}{{}^{m+w}C_m}$ (c) $p_1 = p_2$ if and only if $w = 1$ (d) $p_2 < p_1$ if $w > 1$

**95.** Three player *A, B* and *C*, toss a coin cyclically in that order (that is *A, B, C, A, B, C, A, B*,....) till a head shows. Let *p* be the probability that the coin shows a head. Let $\alpha, \beta$ and $\gamma$ be, respectively, the probabilities that $A, B$ and *C* gets the first head. Then

(a) $\beta = (1-p)\alpha$ (b) $\gamma + 2p\alpha = (1+p^2)\alpha$ (c) $\alpha + \beta + \gamma = 1$ (d) $\alpha = 1/(3-3p+p^2)$

**96.** Two players *A* and *B* toss a fair coin cyclically in the following order $A, A, B, A, A, B$.... till a head shows (that is, *A* will be allowed first two tosses, followed by a single toss of *B*). Let $\alpha(\beta)$ denote the probability that $A(B)$ gets the head first. Then

(a) $\alpha = 6/7$ (b) $\alpha = 5/7$ (c) $\beta = 1/7$ (d) $\beta = 2/7$

**97.** Three political parties are contesting election for $(2n+1)$ Lok Sabha seats. the probability that there will be a coalition government after the election is

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

**98.** *A* and *B* each throw a dice. The probability that *A*'s throw is not greater than *B*'s is

(a) 1/6 (b) 5/12 (c) 1/2 (d) 7/12

**99.** A binary operation is chosen at random from the set of all binary operations on a set *A* containing *n* elements. The probability that the binary operation is commutative is

(a) $\frac{n^n}{n^{n^2}}$ (b) $\frac{n^{n/2}}{n^{n^2}}$ (c) $\frac{n^{n/2}}{n^{n^2/2}}$ (d) None of these

**100.** Let a die is loaded in such a way that even faces are twice as likely to occur as the odd faces. The probability that a prime number will show up when the die is tossed is

(a) $\frac{2}{9}$ (b) $\frac{4}{9}$ (c) $\frac{1}{9}$ (d) $\frac{2}{3}$

**101.** A special die with numbers $1, -1, 2, -2, 0$ and 3 is thrown thrice. The probability that the total is zero is

(a) $\frac{25}{216}$ (b) $\frac{214}{217}$ (c) $\frac{11}{216}$ (d) None of these

**102.** If four small squares are chosen at random on a chess board, the probability that they lie on a diagonal line is

(a) $\frac{13}{22692}$ (b) $\frac{11}{22692}$ (c) $\frac{7}{22692}$ (d) $\frac{2}{7}$

**103.** A letter is taken at random out of each of the words CHOICE and CHANCE. The probability that they should be the same letter is

(a) 1/6 (b) 1/9 (c) 5/36 (d) 1/324

**104.** Let *X* be a set containing *n* elements. If two subsets A and B of X are picked at random, the probability that A and B have the same number of elements is

(a) $\frac{{}^{2n}C_n}{2^{2n}}$ (b) $\frac{1}{{}^{2n}C_n}$ (c) $\frac{1.3.5....(2n-1)}{2^n(n!)}$ (d) $\frac{3^n}{4^n}$

**105.** A four figure number is formed of the figures 1, 2, 3, 5 with no repetitions. The probability that the number is divisible by 5 is

(a) 3/4 (b) 1/4 (c) 1/8 (d) None of these

**106.** An elevator starts with *m* passengers and stops at *n* floors $(m \le n)$. The probability that no two passengers alight at the same floor is

(a) $\frac{{}^nP_m}{m^n}$ (b) $\frac{{}^nP_m}{n^m}$ (c) $\frac{{}^nC_m}{m^n}$ (d) $\frac{{}^nC_m}{n^m}$

**107.** If ten objects are distributed at random among ten persons, the probability that at least one of them will not get any thing is

(a) $\frac{10^{10}-10}{10^{10}}$ (b) $\frac{10^{10}-10!}{10^{10}}$ (c) $\frac{10^{10}-1}{10^{10}}$ (d) None of these

**108.** Cards are drawn one by one without replacement from a pack of 52 cards. The probability that 10 cards will precede the first ace is

(a) $\frac{241}{1456}$ (b) $\frac{164}{4165}$ (c) $\frac{451}{884}$ (d) None of these

**109.** Five different objects $A_1, A_2, A_3, A_4, A_5$ are distributed randomly in 5 places marked 1, 2, 3, 4, 5. One arrangement is picked at random. The probability that in the selected arrangement, none of the object occupies the place corresponding to its number, is

(a) 119/120 (b) 1/15 (c) 11/30 (d) None of these

**110.** 4 gentlemen and 4 ladies take seats at random round a table. The probability that they are sitting alternately is

(a) $\frac{4}{35}$ (b) $\frac{1}{70}$ (c) $\frac{2}{35}$ (d) $\frac{1}{35}$

**111.** Let $x = 33^n$. The index *n* is given a positive integral value at random. The probability that the value of *x* will have 3 in the units place is

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

**112.** There are 7 seats in a row. Three persons take seats at random. The probability that the middle seat is always occupied and no two persons are consecutive is

(a) $\frac{9}{70}$ (b) $\frac{9}{35}$ (c) $\frac{4}{35}$ (d) None of these

**113.** 10 different books and 2 different pens are given to 3 boys so that each gets equal number of things. The probability that the same boy does not receive both the pens is

(a) $\frac{5}{11}$ (b) $\frac{7}{11}$ (c) $\frac{2}{3}$ (d) $\frac{6}{11}$

**114.** The probability that out of 10 persons, all born in April, at least two have the same birthday is

(a) $\frac{^{30}P_{10}}{(30)^{10}}$ (b) $1-\frac{^{30}C_{10}}{30!}$ (c) $\frac{(30)^{10}-{}^{30}P_{10}}{(30)^{10}}$ (d) None of these

**115.** A and B draw two cards each, one after another, from a pack of well-shuffled pack of 52 cards. The probability that all the four cards drawn are of the same suit is

(a) $\frac{44}{85\times 49}$ (b) $\frac{11}{85\times 49}$ (c) $\frac{13\times 24}{17\times 25\times 49}$ (d) None of these

**116.** Three different numbers are selected at random from the set $A=\{1,2,3,.....,10\}$. The probability that the product of two of the numbers is equal to the third is

(a) $\frac{3}{4}$ (b) $\frac{1}{40}$ (c) $\frac{1}{8}$ (d) None of these

**117.** A point is selected at random from the interior of a circle. The probability that the point is closer to the centre than the boundary of the circle is

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

**118.** Let *A* and *B* are two independent events. The probability that both *A* and *B* occur together is 1/6 and the probability that neither of them occurs is 1/3. The probability of occurrence of *A* is

**[Rajasthan PET 2000; Roorkee 1989]**

(a) 0 or 1 (b) 1/2 or 1/3 (c) 1/2 or 1/4 (d) 1/3 or 1/4

## *Odds in favour and Odds against*

### *Basic Level*

**119.** For an event, odds against is 6 : 5. The probability that event does not occur, is

(a) $\frac{5}{6}$ (b) $\frac{6}{11}$ (c) $\frac{5}{11}$ (d) $\frac{1}{6}$

**120.** An event has odds in favour 4 : 5, then the probability that event occurs, is

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

**121.** A card is drawn from a pack of 52 cards. A gambler bets that it is a spade or an ace. What are the odds against his winning this bet

(a) 17 : 52 (b) 52 : 17 (c) 9 : 4 (d) 4 : 9

**122.** The odds in favour of a certain event are 2 : 5 and odds against of another event are 5 : 6. If the events are independent, then the probability of happening of at least one of them is

(a) 50/77 (b) 51/77 (c) 52/77 (d) 53/77

**123.** In a horse race the odds in favour of three horses are 1 : 2, 1 : 3 and 1 : 4. The probability that one of the horse will win the race is

(a) $\frac{37}{60}$ (b) $\frac{47}{60}$ (c) $\frac{27}{60}$ (d) $\frac{17}{60}$

### Advance Level

**124.** Odds 8 to 5 against a person who is 40 years old living till he is 70 and 4 to 3 against another person now 50 till he will be living 80. Probability that one of them will be alive next 30 years is

(a) 59/91 (b) 44/91 (c) 51/91 (d) 32/91

**125.** One of the two events must occur. If the chance of one is 2/3 of the other, then odds in favour of the other are

(a) 2 : 3 (b) 1 : 3 (c) 3 : 1 (d) 3 : 2

**126.** If a party of $n$ persons sit at a round table, then the odds against two specified individuals sitting next to each other are **[MP PET 2002]**

(a) $2:(n-3)$ (b) $(n-3):2$ (c) $(n-2):2$ (d) $2:(n-2)$

**127.** If odds against solving a question by three students are 2 : 1, 5 : 2 and 5 : 3 respectively, then probability that the question is solved only by one student is

(a) 31/56 (b) 24/56 (c) 25/56 (d) None of these

**128.** 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) $\frac{1}{6} \le P(B) \le \frac{1}{3}$ (b) $\frac{1}{3} \le P(B) \le \frac{1}{2}$ (c) $\frac{1}{12} \le P(B) \le \frac{3}{4}$ (d) None of these

**129.** The chance of an event happening is the square of the chance of a second event but the odds against the first are the cube of the odds against the second. The chances of the events are

(a) $\frac{1}{9}, \frac{1}{3}$ (b) $\frac{1}{16}, \frac{1}{4}$ (c) $\frac{1}{4}, \frac{1}{2}$ (d) None of these

## Addition Theorem on Probability

### Basic Level

**130.** If $A$ and $B$ are two mutually exclusive events, then $P(A+B) =$ **[MNR 1978; MP PET 1991, 1992]**

(a) $P(A)+P(B)-P(AB)$ (b) $P(A)-P(B)$ (c) $P(A)+P(B)$ (d) $P(A)+P(B)+P(AB)$

**131.** If $A$ and $B$ are two events such that $P(A \cup B)+P(A \cap B)=\frac{7}{8}$ and $P(A)=2P(B)$, then $P(A) =$

(a) $7/12$ (b) $7/24$ (c) $5/12$ (d) $17/24$

**132.** A bag contains 5 brown and 4 white socks. A man pulls out two socks. The probability that these are of the same colour is **[UPSEAT 1999; MP PET 2000]**

(a) 5/108 (b) 18/108 (c) 30/108 (d) 48/108

**133.** The probability that a leap year will have 53 Fridays or 53 Saturdays is **[MP PET 2002; Roorkee 1999]**

(a) 2/7 (b) 3/7 (c) 4/7 (d) 1/7

**134.** A box contains 10 good articles and 6 with defects. One article is chosen at random. What is the probability that it is either good or has a defect

(a) 24/64 (b) 40/64 (c) 49/64 (d) 64/64

**135.** The probabilities of occurrence of two events are respectively 0.21 and 0.49. The probability that both occurs simultaneously is 0.16. Then the probability that none of the two occurs is

(a) 0.30 (b) 0.46 (c) 0.14 (d) None of these

**136.** A bag contains 30 balls numbered from 1 to 30, one ball is drawn randomly. The probability that number on the ball is multiple of 5 or 7 is

(a) 1/2 (b) 1/3 (c) 2/3 (d) 1/4

**137.** If $P(A) = P(B) = x$ and $P(A \cap B) = P(A' \cap B') = \frac{1}{3}$, then $x$ = **[UPSEAT 2003]**

(a) 1/2 (b) 1/3 (c) 1/4 (d) 1/6

**138.** If the probability of $X$ to fail in the examination is 0.3 and that for $Y$ is 0.2, then the probability that either $X$ or $Y$ fail in the examination is

(a) 0.5 (b) 0.44 (c) 0.6 (d) None of these

**139.** A card is drawn from a well shuffled pack of cards. The probability of getting a queen of club or king of heart is **[MP PI**

(a) 1/52 (b) 1/26 (c) 1/18 (d) None of these

**140.** If $A$ and $B$ are two independent events, then $P(A+B)$ = **[MP PET 1992]**

(a) $P(A)+P(B)-P(A)P(B)$ (b) $P(A)-P(B)$ (c) $P(A)+P(B)$ (d) $P(A)+P(B)+P(A)P(B)$

**141.** In two events $P(A \cup B) = 5/6$, $P(A^c) = 5/6$, $P(B) = 2/3$, then $A$ and $B$ are **[UPSEAT 2001]**

(a) Independent (b) Mutually exclusive (c) Mutually exhaustive (d) Dependent

**142.** The probability that at least one of the events $A$ and $B$ occurs is 3/5. If $A$ and $B$ occur simultaneously with probability 1/5, then $P(A')+P(B')$ is

(a) 2/5 (b) 4/5 (c) 6/5 (d) 7/5

**143.** If $A$ and $B$ are arbitrary events, then **[DCE 2002]**

(a) $P(A \cap B) \geq P(A)+P(B)$ (b) $P(A \cup B) \leq P(A)+P(B)$ (c) $P(A \cap B) = P(A)+P(B)$ (d) None of these

**144.** If $P(A) = 2/3$, $P(B) = 1/2$ and $P(A \cup B) = 5/6$ then events $A$ and $B$ are **[Kerala (Engg.) 2002]**

(a) Mutually exclusive (b) Independent as well as mutually exhaustive

(c) Independent (d) Dependent only on $A$

**145.** A bag contains 5 black balls, 4 white balls and 3 red balls. If a ball is selected randomwise, the probability that it is a black or red ball is **[EAMCET 2002]**

(a) 1/3 (b) 1/4 (c) 5/12 (d) 2/3

**146.** A card is drawn from a pack of cards. Find the probability that the card will be a queen or a heart

(a) $\frac{4}{3}$ (b) $\frac{16}{3}$ (c) $\frac{4}{13}$ (d) $\frac{5}{3}$

**147.** The chance of India winning toss is 3/4. If it wins the toss, then its chance of victory is 4/5 otherwise it is only 1/2. Then chance of India's victory is

(a) 1/5 (b) 3/5 (c) 3/40 (d) 29/40

**148.** Let $A$ and $B$ be events for which $P(A) = x$, $P(B) = y$, $P(A \cap B) = z$, then $P(\overline{A} \cap B)$ equals **[AMU 1999]**

(a) $(1-x)y$ (b) $1-x+y$ (c) $y - z$ (d) $1-x+y-z$

**149.** $A$ and $B$ are two events such that $P(A) = 0.4$, $P(A+B) = 0.7$ and $P(AB) = 0.2$, then $P(B) =$

(a) 0.1 (b) 0.3 (c) 0.5 (d) None of these

**150.** A card is drawn at random from a pack of cards. The probability of this card being a red or a queen is

(a) 1/13 (b) 1/26 (c) 1/2 (d) 7/13

**151.** If $P(A) = 0.4, P(B) = x, P(A \cup B) = 0.7$ and the events A and B are mutually exclusive, then $x$ =

(a) 3/10 (b) 1/2 (c) 2/5 (d) 1/5

**152.** One card is drawn randomly from a pack of 52 cards, then the probability that it is a king or spade is **[Rajasthan PET 2001, 1996; MP PET 1990, 94]**

(a) 1/26 (b) 3/26 (c) 4/13 (d) 3/13

**153.** The chance of throwing a total of 7 or 12 with 2 dice, is **[Kurukshetra CEE 2002]**

(a) $\frac{2}{9}$ (b) $\frac{5}{9}$ (c) $\frac{5}{36}$ (d) $\frac{7}{36}$

**154.** The probability of three mutually exclusive events A, B and C are given by 2/3, 1/4 and 1/6 respectively. The statement **[MNR 1987]**

(a) Is true (b) False (c) Nothing can be said (d) Could be either

**155.** If $A_1, A_2, \ldots, A_n$ are any $n$ events, then

(a) $P(A_1 \cup A_2 \cup \ldots \cup A_n) = P(A_1) + P(A_2) + \ldots + P(A_n)$ (b) $P(A_1 \cup A_2 \cup \ldots \cup A_n) > P(A_1) + P(A_2) + \ldots + P(A_n)$

(c) $P(A_1 \cup A_2 \cup \ldots \cup A_n) \le P(A_1) + P(A_2) + \ldots + P(A_n)$ (d) None of these

**156.** In a class of 125 students 70 passed in Mathematics, 55 in Statistics and 30 in both. The probability that a student selected at random from the class, has passed in only one subject is

(a) 13/25 (b) 3/25 (c) 17/25 (d) 8/25

**157.** A speaks truth in 60% cases and $B$ speaks truth in 70% cases. The probability that they will say the same thing while describing single event is

(a) 0.56 (b) 0.54 (c) 0.38 (d) 0.94

**158.** The chances of throwing a total of 3 or 5 or 11 with two dice is

(a) 5/36 (b) 1/9 (c) 2/9 (d) 19/36

**159.** In a box there are 2 red, 3 black and 4 white balls. Out of these three balls are drawn together. The probability of these being of same colour is

(a) $\frac{1}{84}$ (b) $\frac{1}{21}$ (c) $\frac{5}{84}$ (d) None of these

**160.** A card is drawn at random from a well shuffled pack of 52 cards. The probability of getting a two of heart or diamond is **[DSSE 1979]**

(a) $\frac{1}{26}$ (b) $\frac{1}{52}$ (c) $\frac{1}{13}$ (d) None of these

**161.** A committee of five is to be chosen from a group of 9 people. The probability that a certain married couple will either serve together or not at all is

(a) $\frac{1}{2}$ (b) $\frac{5}{9}$ (c) $\frac{4}{9}$ (d) $\frac{2}{3}$

**162.** A and B toss a coin alternately, the first to show a head being the winner. If A starts the game, the chance of his winning is **[MP PET 1987]**

(a) 5/8 (b) 1/2 (c) 1/3 (d) 2/3

**163.** If A and B are two events, then the probability of the event that at most one of A, B occurs, is

(a) $P(A' \cap B) + P(A \cap B') + P(A' \cap B')$ (b) $1 - P(A \cap B)$

(c) $P(A') + P(B') + P(A \cup B) - 1$ (d) All of these

**164.** Three persons work independently on a problem. If the respective probabilities that they will solve it are 1/3, 1/4 and 1/5, then the probability that none can solve it

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

**165.** The probability of hitting a target by three marksmen are $\frac{1}{2}, \frac{1}{3}$ and $\frac{1}{4}$ respectively. The probability that one and only one of them will hit the target when they fire simultaneously, is

(a) $\frac{11}{24}$ (b) $\frac{1}{12}$ (c) $\frac{1}{8}$ (d) None of these

**166.** If *A* speaks truth in 75% cases and *B* in 80% cases, then the probability that they contradict each other in stating the same statement, is **[MP PET 1997, 2002]**

(a) $\frac{7}{20}$ (b) $\frac{13}{20}$ (c) $\frac{12}{20}$ (d) $\frac{2}{5}$

**167.** The probabilities that A and B will die within a year are *p* and *q* respectively, then the probability that only one of them will be alive at the end of the year is

(a) $p + q$ (b) $p + q - 2qp$ (c) $p + q - pq$ (d) $p + q + pq$

**168.** If from each of the three boxes containing 3 white and 1 black, 2 white and 2 black, 1 white and 3 black balls. One ball is drawn at random. Then the probability that 2 white and 1 black ball will be drawn

(a) 13/32 (b) 1/4 (c) 1/32 (d) 3/16

**169.** A student appears for tests I, II and III. The student is successful if he passes either in tests I and II or tests I and III. The probabilities of the student passing in tests I, II, III are p, q and 1/2 respectively. If the probability that the student is successful is 1/2, then

(a) $p = q = 1$ (b) $p = q = 1/2$

(c) $p = 1, q = 0$ (d) There are infinite values of *p*, *q*

**170.** A bag contains 3 white, 3 black and 2 red balls. One by one three balls are drawn without replacing them. The probability that the third ball is red, is

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

**171.** The probability of *A*, *B*, *C* solving a problem are $\frac{1}{3}, \frac{2}{7}, \frac{3}{8}$ respectively. If all the three try to solve the problem simultaneously, the probability that exactly one of them will solve it, is

(a) $\frac{25}{168}$ (b) $\frac{25}{56}$ (c) $\frac{20}{168}$ (d) $\frac{30}{168}$

**172.** The two events *A* and *B* have probabilities 0.25 and 0.50 respectively. The probability that both *A* and *B* occur simultaneously is 0.14. Then the probability that neither *A* nor *B* occurs is

(a) 0.39 (b) 0.25 (c) 0.904 (d) None of these

**173.** A basket contains 5 apples and 7 oranges and another basket contains 4 apples and 8 oranges. One fruit is picked out from each basket. Find the probability that the fruits are both apples or both oranges

(a) 24/144 (b) 56/144 (c) 68/144 (d) 76/144

**174.** *A*, *B*, *C* are any three events. If $P(S)$ denotes the probability of *S* happening then $P(A \cap (B \cup C)) =$

(a) $P(A) + P(B) + P(C) - P(A \cap B) - P(A \cap C)$ (b) $P(A) + P(B) + P(C) - P(B)P(C)$

(c) $P(A \cap B) + P(A \cap C) - P(A \cap B \cap C)$ (d) None of these

**175.** If *A* and *B* are any two events, then the probability that exactly one of them occur is **[Ranchi BIT 1990; IIT 1984; Rajasthan PET 2002]**

(a) $P(A) + P(B) - P(A \cap B)$ (b) $P(A) + P(B) - 2P(A \cap B)$ (c) $P(A) + P(B) - P(A \cup B)$ (d) $P(A) + P(B) - 2P(A \cup B)$

**176.** If $A$ and $B$ are any two events, then $P(\overline{A} \cap B) =$ **[MP PET 2001]**

(a) $P(\overline{A})P(\overline{B})$ (b) $1 - P(A) - P(B)$ (c) $P(A) + P(B) - P(A \cap B)$ (d) $P(B) - P(A \cap B)$

**177.** If $A$ and $B$ are any two events, then the true relation is **[IIT 1988]**

(a) $P(A \cap B)$ is not less than $P(A) + P(B) - 1$ (b) $P(A \cap B)$ is not greater than $P(A) + P(B)$

(c) $P(A \cap B) = P(A) + P(B) - P(A \cup B)$ (d) $P(A \cap B) = P(A) + P(B) + P(A \cup B)$

**178.** A bag contains 3 black and 4 white balls. Two balls are drawn one by one at random without replacement. The probability that the second drawn ball is white, is

(a) $\frac{4}{49}$ (b) $\frac{1}{7}$ (c) $\frac{4}{7}$ (d) $\frac{12}{49}$

**179.** If $P(A) = 0.25, P(B) = 0.50$ and $P(A \cap B) = 0.14,$ then $P(A \cap \overline{B})$ is equal to **[Rajasthan PET 2001]**

(a) 0.61 (b) 0.39 (c) 0.48 (d) None of these

**180.** Suppose that $A$, $B$, $C$ are events such that $P(A) = P(B) = P(C) = \frac{1}{4}, P(AB) = P(CB) = 0, P(AC) = \frac{1}{8}$, then $P(A + B) =$ **[MP PET 1992]**

(a) 0.125 (b) 0.25 (c) 0.375 (d) 0.5

**181.** For any two independent events $E_1$ and $E_2$ $P\{(E_1 \cup E_2) \cap (\overline{E}_1 \cap \overline{E}_2)\}$ is **[IIT 1991]**

(a) $\leq \frac{1}{4}$ (b) $> \frac{1}{4}$ (c) $\geq \frac{1}{2}$ (d) None of these

**182.** Two cards are drawn without replacement from a well-shuffled pack. Find the probability that one of them is an ace of heart **[UPSEAT 2002]**

(a) $\frac{1}{25}$ (b) $\frac{1}{26}$ (c) $\frac{1}{52}$ (d) None of these

**183.** If $P(A \cup B) = 0.8$ and $P(A \cap B) = 0.3,$ then $P(\overline{A}) + P(\overline{B}) =$ **[EAMCET 2003]**

(a) 0.3 (b) 0.5 (c) 0.7 (d) 0.9

**184.** If $A$ and $B$ are two independent events such that $P(A \cap B') = \frac{3}{25}$ and $P(A' \cap B) = \frac{8}{25}$, then $P(A) =$

(a) $\frac{1}{5}$ (b) $\frac{3}{8}$ (c) $\frac{2}{5}$ (d) $\frac{4}{5}$

**185.** If $A$ and $B$ are two independent events such that $P(A)$ = 0.40, $P(B) = 0.50$, then $P$ (neither $A$ nor $B$) is equal to

(a) 0.90 (b) 0.10 (c) 0.2 (d) 0.3

## Advance Level

**186.** The probability of India winning a test match against West Indies is $\frac{1}{2}$. Assuming independence from match to match, the probability that in a 5 match series India's second win occurs at the third test is

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

**187.** A box contains 3 white and 2 red balls. A ball is drawn and another ball is drawn without replacing first ball, then the probability of second ball to be red is

(a) $\frac{8}{25}$ (b) $\frac{2}{5}$ (c) $\frac{3}{5}$ (d) $\frac{21}{25}$

**188.** The probability of solving a question by three students are $\frac{1}{2}, \frac{1}{4}, \frac{1}{6}$ respectively. Probability of question is being solved will be

**[UPSEAT 1999]**

(a) $\frac{33}{48}$ (b) $\frac{35}{48}$ (c) $\frac{31}{48}$ (d) $\frac{37}{48}$

**189.** Three groups of children contain respectively 3 girls and 1 boy, 2 girls and 2 boys, one girl and 3 boys. One child is selected at random from each group. The chance that three selected consisting of 1 girl and 2 boys, is]

(a) $\frac{9}{32}$ (b) $\frac{3}{32}$ (c) $\frac{13}{32}$ (d) None of these

**190.** *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

**191.** A student has to match three historical events-Dandi March, Quit India Movement and Mahatma Gandhi's assassination with the years 1948, 1930 and 1942. The student has no knowledge of the correct answers and decides to match the events and years randomly. Let $E_i(0\leq i\leq 3)$ denote the event that the student gets exactly *i* correct answers. Then

(a) $P(E_0)+P(E_3)=P(E_1)$ (b) $P(E_0)P(E_1)=P(E_3)$ (c) $P(E_0\cap E_1)=P(E_2)$ (d) $P(E_0)+P(E_1)+P(E_3)=1$

**192.** Given that *A*, *B* and *C* are events such that $P(A)=P(B)=P(C)=1/5, P(A\cap B)=P(B\cap C)=0$ and $P(A\cap C)=1/10$.

The probability that at least one of the events *A, B* or *C* occurs is

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

**193.** Suppose that a die (with faces marked 1 to 6) is loaded in such a manner that for *K* = 1, 2, 3...., 6, the probability of the face marked *K* turning up when die is tossed is proportional to *K*. The probability of the event that the outcome of a toss of the die will be an even number is equal to

(a) $\frac{1}{2}$ (b) $\frac{4}{7}$ (c) $\frac{2}{5}$ (d) $\frac{1}{21}$

**194.** An unbiased die is tossed until a number greater than 4 appears. The probability that an even number of tosses is needed is

**[IIT Screening 1994]**

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

**195.** For the three events $A, B$ and $C$ ; *P*(exactly one of the events *A* or *B* occurs) = *P* (exactly one of the events *B* or *C* occurs) = *P*(exactly one of the events *C* or *A* occurs) = *p* and *P* (all the three events occur simultaneously) = $p^2$, where $0<p<1/2$. Then the probability of at least one of the three events *A*, *B* and *C* occurring is **[IIT 1996]**

(a) $\frac{3p+2p^2}{2}$ (b) $\frac{p+3p^2}{4}$ (c) $\frac{p+3p^2}{2}$ (d) $\frac{3p+2p^2}{4}$

**196.** A man alternately tosses a coin and throws a dice beginning with the coin. The probability that he gets a head in the coin before he gets a 5 or 6 in the dice is

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

**197.** Two cards are drawn successively with replacement from a pack of 52 cards. The probability of drawing two aces is

**[MNR 1988; UPSEAT 2000]**

(a) $\frac{1}{169}$ (b) $\frac{1}{221}$ (c) $\frac{1}{2652}$ (d) $\frac{4}{663}$

**198.** A pack of cards contains 4 aces, 4 kings, 4 queens and 4 jacks. Two cards are drawn at random. The probability that at least one of these in an ace, is

(a) $\frac{9}{20}$ (b) $\frac{3}{16}$ (c) $\frac{1}{6}$ (d) $\frac{1}{9}$

**199.** From a pack of 52 cards, two cards are drawn one by one without replacement. The probability that first drawn card is king and second is queen, is

(a) $\frac{2}{13}$ (b) $\frac{8}{663}$

(c) $\frac{4}{663}$ (d) $\frac{103}{663}$

**200.** From a pack of 52 cards two cards are drawn in succession one by one without replacement. The probability that both are aces **OR** the probability that both are kings is
**[Rajasthan PET 2001; MP PET 1994]**
(a) 2/13 (b) 1/51 (c) 1/221 (d) 2/21

**201.** A problem in Mathematics is given to three students *A*, *B*, *C* and their respective probability of solving the problem is 1/2, 1/3 and 1/4. Probability that the problem is solved is
**[Rajasthan PET 2001; AIEEE 2002]**
(a) 3/4 (b) 1/2 (c) 2/3 (d) 1/3

**202.** A coin is tossed and a dice is rolled. The probability that the coin shows the head and the dice shows 6 is
(a) 1/8 (b) 1/12 (c) 1/2 (d) 1

**203.** A coin is tossed until a head appears or until the coin has been tossed five times. If a head does not occur on the first two tosses, then the probability that the coin will be tossed 5 times is
(a) $\frac{1}{2}$ (b) $\frac{3}{5}$ (c) $\frac{1}{4}$ (d) $\frac{1}{3}$

**204.** A bag contains 5 white, 7 red and 8 black balls. If four balls are drawn one by one without replacement, what is the probability that all are white
(a) $\frac{1}{969}$ (b) $\frac{1}{380}$ (c) $\frac{5}{20}$ (d) None of these

**205.** A bag contains 19 tickets numbered from 1 to 19. A ticket is drawn and then another ticket is drawn without replacement. The probability that both the tickets will show even number, is
(a) $\frac{9}{19}$ (b) $\frac{8}{18}$ (c) $\frac{9}{18}$ (d) $\frac{4}{19}$

**206.** For two events *A* and *B*, if $P(A)=P\left(\frac{A}{B}\right)=\frac{1}{4}$ and $P\left(\frac{B}{A}\right)=\frac{1}{2}$, then
(a) *A* and *B* are independent (b) $P\left(\frac{A'}{B}\right)=\frac{3}{4}$ (c) $P\left(\frac{B'}{A'}\right)=\frac{1}{2}$ (d)

**207.** If $P(A)=\frac{1}{2}, P(B)=\frac{1}{3}$ and $P(A\cap B)=\frac{1}{4}$, then $P\left(\frac{B}{A}\right)=$
(a) 1 (b) 0 (c) 1/2 (d) 1/3

**208.** From a pack of 52 cards two are drawn with replacement. The probability that the first is a diamond and the second is a king is
**[MNR 1979]**
(a) 1/26 (b) 17/2704 (c) 1/52 (d) None of these

**209.** The probability that a teacher will give an unannounced test during any class meeting is 1/5. If a student is absent twice, then the probability that the student will miss at least one test is
(a) 1/5 (b) 2/5 (c) 7/5 (d) 9/25

**210.** If *E* and *F* are independent events such that $0<P(E)<1$ and $0<P(F)<1$, then **[IIT 1989]**
(a) *E* and $F^c$ (the complement of the event *F*) are independent (b) $E^c$ and $F^c$ are independent
(c) $P\left(\frac{E}{F}\right)+P\left(\frac{E^c}{F^c}\right)=1$ (d) All of these

**211.** The probability of getting at least one tail in 4 throws of a coin is
**[MNR 1983; Kurukshetra CEE 1998]**
(a) 15/16 (b) 1/16 (c) 1/4 (d) None of these

**212.** If any four numbers are selected and they are multiplied, then the probability that the last digit will be 1, 3, 5 or 7 is
**[Rajasthan PET 2002]**
(a) 4/625 (b) 18/625 (c) 16/625 (d) None of these

**213.** A bag contains 4 white balls and 2 black balls. Another contains 3 white balls and 5 black balls. If one ball is drawn from each bag, then the probability that both are white, is

(a) 0.25 (b) 0.2 (c) 0.3 (d) None of these

**214.** A binary number is made up of 16 bits. The probability of an incorrect bit appearing is $p$ and the errors in different bits are independent of one another. The probability of forming an incorrect number is

(a) $p/16$ (b) $p^{16}$ (c) ${}^{16}C_1 p^{16}$ (d) $1-(1-p)^{16}$

**215.** The probabilities of winning the race by two athletes $A$ and $B$ are $\frac{1}{5}$ and $\frac{1}{4}$. The probability of winning by neither of them, is

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

**216.** Seven chits are numbered 1 to 7. Three are drawn one by one with replacements. The probability that the least number on any selected chit is 5, is

(a) $1-\left(\frac{2}{7}\right)^4$ (b) $4\left(\frac{2}{7}\right)^4$ (c) $\left(\frac{3}{7}\right)^3$ (d) None of these

**217.** A box contains 100 tickets numbered 1, 2.....100. Two tickets are chosen at random. It is given that the maximum number on the two chosen tickets is not more than 10. The minimum number on them is 5 with probability **[IIT 1985]**

(a) $\frac{1}{8}$ (b) $\frac{13}{15}$ (c) $\frac{1}{9}$ (d) None of these

**218.** There are 20 cards. 10 of these cards have the letter '*I*' printed on them and the other 10 have the letter '*T*' printed on them. If three cards are picked up at random and kept in the same order, the probability of making word *IIT* is

(a) $\frac{4}{27}$ (b) $\frac{5}{38}$ (c) $\frac{1}{8}$ (d) $\frac{9}{80}$

**219.** Let $A=\{2,3,4,.....,20\}$. A number is chosen at random from the set $A$ and it is found to be a prime number. The probability that it is more than 10 is

(a) $\frac{9}{10}$ (b) $\frac{1}{10}$ (c) $\frac{1}{5}$ (d) $\frac{1}{2}$

**220.** 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) $1-\left(\frac{43}{45}\right)^3$

**221.** The probability that a married man watches a certain T.V. show is 0.4 and the probability that a married woman watches the show is 0.5. The probability that a man watches the show, given that his wife does, is 0.7. Then the probability that a wife watches the shows given that her husband does is

(a) $\frac{7}{8}$ (b) $\frac{3}{5}$ (c) $\frac{2}{7}$ (d) 1

**222.** A pair of fair dice is rolled together till a sum of either 5 or 7 is obtained. Then the probability that 5 comes before 7 is **[IIT 1989]**

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

**223.** A bag contains 3 red and 5 black balls and a second bag contains 6 red and 4 black balls. A ball is drawn from each bag. The probability that one is red and other is black, is

(a) $\frac{3}{20}$ (b) $\frac{21}{40}$ (c) $\frac{3}{8}$ (d) All of these

**224.** Two persons $A$ and $B$ take turns in throwing a pair of dice. The first person to through 9 from both dice will be avoided the prize. If $A$ throws first then the probability that $B$ wins the game is

(a) $\frac{9}{17}$ (b) $\frac{8}{17}$ (c) $\frac{8}{9}$ (d) $\frac{1}{9}$

**225.** An anti-aircraft gun take a maximum of four shots at an enemy plane moving away from it. The probability of hitting the plane at the first, second, third and fourth shot are 0.4, 0.3, 0.2 and 0.1 respectively. The probability that the gun hits the plane is

(a) 0.25 (b) 0.21 (c) 0.16 (d) 0.6976

**226.** If $A$ and $B$ are two events such that $P(A/B) = P(A'/B') = p$ and $P(B) = 0.05,$ then value of $p$ so that $P(B/A) = 0.5$ is

(a) 0.75 (b) 0.85 (c) 0.95 (d) 1

**227.** Eight tickets numbered 000, 010, 011, 011, 100, 101, 101 and 110 are placed in a bag. One ticket is drawn from the bag at random. Let $A$, $B$ and $C$ denote the following events: $A$ – "the first digit is 0" $B$– "the second digit is 0" and $C$ – "the third digit is 0". then $A$, $B$ and $C$ are

(a) Independent (b) Mutually exclusive (c) Mutually non-exclusive (d) Not independent

**228.** A die is rolled three times. Let $E_1$ denote the event of getting a number larger than the previous number each time and $E_2$ denote the event that the numbers form an increasing A.P., then

(a) $P(E_2) \le P(E_1)$ (b) $P(E_2 \cap E_1) = 1/36$ (c) $P(E_2 \mid E_1) = 3/10$ (d) $P(E_1) = (10/3)P(E_2)$

**229.** A reputed coaching employed 8 professors in the staff. Their respective probabilities of remaining in employment for three years are $\frac{2}{10}, \frac{3}{10}, \frac{4}{10}, \frac{5}{10}, \frac{6}{10}, \frac{7}{10}, \frac{8}{10}, \frac{9}{10}$. The probability that after 3 years at least six of these still work in the coaching is

(a) 0.15 (b) 0.19 (c) 0.3 (d) None of these

**230.** For a biased die the probabilities for different faces to turn up are given below

| *Face*: | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| *Probability:* | .1 | .32 | .21 | .15 | .05 | .17 |

The die is tossed and you are told that either face 1 or 2 has turned up. Then the probability that it is face 1, is **[IIT 1981**

(a) 5/21 (b) 5/22 (c) 4/21 (d) None of these

**231.** A biased die is tossed and the respective probabilities for various faces to turn up are given below

| *Face*: | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| *Probability:* | .1 | .24 | .19 | .18 | .15 | .14 |

If an even face has turned up, then the probability that it is face 2 or face 4, is **[MNR 1992]**

(a) 0.25 (b) 0.42 (c) 0.75 (d) 0.9

**232.** A bag $X$ contains 2 white and 3 black balls and another bag $Y$ contains 4 white and 2 black balls. One bag is selected at random and a ball is drawn from it. Then the probability for the ball chosen to be white is

(a) 2/15 (b) 7/15 (c) 8/15 (d) 14/15

**233.** A man draws a card from a pack of 52 playing cards, replaces it and shuffles the pack. He continues this processes until he gets a card of spade. The probability that he will fail the first two times is

(a) 9/16 (b) 1/16 (c) 9/64 (d) None of these

**234.** For any two events $A$ and $B$ in a sample space **[IIT 1991]**

(a) $P\left(\frac{A}{B}\right) \ge \frac{P(A)+P(B)-1}{P(B)}, P(B) \ne 0$ is always true (b) $P(A \cap B) = P(A) - P(A \cap B)$ does not hold

(c) $P(A \cup B) = 1 - P(\overline{A})P(\overline{B})$, if $A$ and $B$ are disjoint (d) None of these

**235.** Three groups $A$, $B$, $C$ are competing for positions on the Board of Directors of a company. The probabilities of their winning are 0.5, 0.3, 0.2 respectively. If the group $A$ wins, the probability of introducing a new product is 0.7 and the corresponding probabilities for group $B$ and $C$ are 0.6 and 0.5 respectively. The probability that the new product will be introduced, is **[Roorkee 1994]**

(a) 0.18 (b) 0.35 (c) 0.10 (d) 0.63

**236.** If $\overline{E}$ and $\overline{F}$ are the complementary events of events $E$ and $F$ respectively and if $0 < P(F) < 1$, then

(a) $P(E/F) + P(\overline{E}/F) = 1$ (b) $P(E/F) + P(E/\overline{F}) = 1$ (c) $P(\overline{E}/F) + P(E/\overline{F}) = 1$ (d) $P(E/\overline{F}) + P(\overline{E}/\overline{F}) = 1$

**237.** Let $A$, $B$, $C$ be three mutually independent events. Consider the two statements $S_1$ and $S_2$

$S_1 : A$ and $B \cup C$ are independent; $S_2 : A$ and $B \cap C$ are independent

Then **[IIT Screening 1994]**

(a) Both $S_1$ and $S_2$ are true (b) Only $S_1$ is true (c) Only $S_2$ is true (d)

**238.** In a certain town, 40% of the people have brown hair, 25% have brown eyes and 15% have both brown hair and brown eyes. If a person selected at random from the town, has brown hair, the probability that he also has brown eyes, is **[MNR 1988]**

(a) 1/5 (b) 3/8 (c) 1/3 (d) 2/3

**239.** Let $0 < P(A) < 1, 0 < P(B) < 1$ and $P(A \cup B) = P(A) + P(B) - P(A)P(B)$. Then **[IIT 1995]**

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

**240.** It has been found that if *A* and *B* play a game 12 times, A wins 6 times, B wins 4 times and they draw twice. A and B take part in a series of 3 games. The probability that they will win alternately is

(a) $\frac{5}{72}$ (b) $\frac{5}{36}$ (c) $\frac{19}{27}$ (d) None of these

**241.** Two dice are rolled one after the other. The probability that the number on the first is smaller than the number on the second is

(a) 1/2 (b) 7/18 (c) 3/4 (d) 5/12

**242.** The two friends *A* and *B* have equal number of daughters. There are three cinema tickets which are to be distributed among the daughters of *A* and *B*. The probability that all the tickets go to daughters of *A* is 1/20. The number of daughters each of them have is

(a) 4 (b) 5 (c) 6 (d) 3

**243.** A bag contains $(2n+1)$ coins. It is known that *n* of these have a head on both the sides, whereas the remaining $(n+1)$ coins are fair. A coin is picked up at random from the bag and tossed. If the probability that the toss results in a head is 31/42, then the value of *n* is

(a) 10 (b) 8 (c) 6 (d) 25

**244.** The letters of the word PROBABILITY are written down at random in a row. Let $E_1$ denote the event that two *I*'s are together and $E_2$ denote the event that two *B*'s are together, then

(a) $P(E_1) = P(E_2)$ (b) $P(E_1 \cap E_2) = 2/55$ (c) $P(E_1 \cup E_2) = 18/55$ (d) $P(E_2/E_1) = 1/5$

## Baye's rule and Total probability

### Basic Level

**245.** In an entrance test there are multiple choice questions. There are four possible answers to each question of which one is correct. The probability that a student knows the answer to a question is 90%. If he gets the correct answer to a question, then the probability that he was guessing, is

(a) $\frac{37}{40}$ (b) $\frac{1}{37}$ (c) $\frac{36}{37}$ (d) $\frac{1}{9}$

**246.** Three urns contain 6 red, 4 black; 4 red, 6 black and 5 red, 5 black balls respectively. One of the urns is selected at random and a ball is drawn from it. If the ball drawn is red, the probability that it is drawn from the first urn is

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

**247.** There are 3 bags, each containing 5 white balls and 3 black balls. Also there are 2 bags, each containing 2 white balls and 4 black balls. A white ball is drawn at random. The probability that this white ball is from a bag of the first group, is

(a) 2/63 (b) 45/61 (c) 2/49 (d) None of these

**248.** 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 hearts. Find the probability of the missing card to be a heart

(a) $\frac{5}{9}$ (b) $\frac{6}{37}$ (c) $\frac{11}{50}$ (d) $\frac{13}{31}$

**249.** One bag contains four white balls and three black balls and a second bag contains three white balls and five black balls. One ball is drawn from the first bag and placed unseen in the second bag. The probability that a ball now drawn from second bag is black is

(a) $\frac{38}{65}$ (b) $\frac{38}{63}$ (c) $\frac{17}{65}$ (d) $\frac{1}{3}$

**250.** A real estate man has eight master keys to open several new homes. Only one master key will open any given house. If 40% of these homes are usually left unlocked, the probability that the real estate man can get into a specific home if he selects three master keys at random before leaving the office is

(a) $\frac{3}{8}$ (b) $\frac{7}{8}$ (c) $\frac{5}{8}$ (d) None of these

**251.** A coin is tossed 3 times by 2 persons. What is the probability that both get equal number of heads

(a) 3/8 (b) 1/9 (c) 5/16 (d) None of these

**252.** A bag $x$ contains 3 white balls and 2 black balls and another bag $y$ contains 2 white balls and 4 black balls. A bag and a ball out of it are picked at random. The probability that the ball is white is

(a) $\frac{3}{5}$ (b) $\frac{7}{15}$ (c) $\frac{1}{2}$ (d) None of these

**253.** The probability that in a year of the $22^{nd}$ century chosen at random there will be 53 Sundays is

(a) 3/28 (b) 2/28 (c) 7/28 (d) 5/28

**254.** If a coin be tossed $n$ times then probability that the head comes odd times is **[Rajasthan PET 2002]**

(a) 1/2 (b) $1/2^n$ (c) $1/2^{n-1}$ (d) None of these

### *Advance Level*

**255.** In a bolt factory, machines $A$, $B$ and $C$ manufacture respectively 25%, 35% and 40% of the total bolts. Of their output 5, 4 and 2 percent respectively are defective bolts. A bolt is drawn at random from the product. If the bolt drawn is found to be defective, the probability that it is manufactured by the machine $B$ is

(a) $\frac{28}{69}$ (b) $\frac{7}{69}$ (c) $\frac{32}{69}$ (d) $\frac{11}{69}$

**256.** An insurance company insured 2000 scooter drivers, 4000 car drivers and 6000 truck drivers. The probability of an accident involving a scooter driver, car driver and a truck driver is 0.01, 0.03 and 0.15 respectively. One of the insured persons meets with an accident. What is the probability that he is a scooter driver

(a) $\frac{1}{52}$ (b) $\frac{1}{62}$ (c) $\frac{2}{51}$ (d) 1

**257.** From an urn containing 3 white and 5 black balls, 4 balls are transferred into an empty urn. From this urn a ball is drawn and is found to be white. The probability that out of the four balls transferred, 3 are white and 1 black is

(a) $\frac{1}{4}$ (b) $\frac{1}{5}$ (c) $\frac{1}{6}$ (d) $\frac{1}{7}$

**258.** In a test, an examinee either guesses or copies or knows the answer to a multiple choice question with four choices. The probability that he makes a guess is 1/3 and the probability that he copies the answer is 1/6. The probability that his answer is correct, given that he copied it, is 1/8. The probability that he knew the answer to the question, given that he correctly answered it, is

(a) $\frac{24}{27}$ (b) $\frac{24}{29}$ (c) $\frac{24}{31}$ (d) None of these

**259.** A company manufactures T.Vs at two different plants $A$ and $B$. Plant '$A$' produces 80% and $B$ produces 20% of the total production. 85 out of 100 T.Vs produced at plant $A$ meet the quality standards while 65 out of 100 T.Vs produced at plant $B$ meet the quality standard. A T.V. produced by the company is selected at random and is not found of meeting the quality standard. The probability that selected T.V. was manufactured by the plant $B$ is

(a) $\frac{7}{11}$ (b) $\frac{7}{19}$ (c) $\frac{2}{3}$ (d) None of these

## *Binomial distribution*

### *Basic Level*

**260.** A coin is tossed 3 times (**OR** Three coins are tossed all together). The probability of getting at least two heads is **[MP PET 1995]**

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

**261.** The probability of having at least one head in 3 throws with a coin is

(a) 7/8 (b) 3/8 (c) 1/8 (d) None of these

**262.** A fair coin is tossed $n$ time. If the probability that head occurs 6 times is equal to the probability that head occurs 8 times, then $n$ is equal to **[Kurukshetra CEE 1998; AMU 2000]**

(a) 15 (b) 14 (c) 12 (d) 7

**263.** The mean and variance of a binomial distribution are 4 and 3 respectively, then the probability of getting exactly six successes in this distribution is

(a) ${}^{16}C_6\left(\frac{1}{4}\right)^{10}\left(\frac{3}{4}\right)^{6}$ (b) ${}^{16}C_6\left(\frac{1}{4}\right)^{6}\left(\frac{3}{4}\right)^{10}$ (c) ${}^{12}C_6\left(\frac{1}{4}\right)^{10}\left(\frac{3}{4}\right)^{6}$ (d) ${}^{12}C_6\left(\frac{1}{4}\right)^{6}\left(\frac{3}{4}\right)^{6}$

**264.** In a binomial probability distribution, mean is 3 and standard deviation is $\frac{3}{2}$. Then the probability distribution is **[AISSE 1979]**

(a) $\left(\frac{3}{4}+\frac{1}{4}\right)^{12}$ (b) $\left(\frac{1}{4}+\frac{3}{4}\right)^{12}$ (c) $\left(\frac{1}{4}+\frac{3}{4}\right)^{9}$ (d) $\left(\frac{3}{4}+\frac{1}{4}\right)^{9}$

**265.** If $X$ follows a binomial distribution with parameters $n=6$ and $p$ and $4(P(X=4))=P(X=2)$, then $p=$

(a) 1/2 (b) 1/4 (c) 1/6 (d) 1/3

**266.** The mean and variance of a binomial distribution are 6 and 4. The parameter $n$ is **[MP PET 2000]**

(a) 18 (b) 12 (c) 10 (d) 9

**267.** Suppose $X$ follows a binomial distribution with parameters $n$ and $p$, where $0<p<1$. If $\frac{P(X=r)}{P(X=n-r)}$ is independent of $n$ and $r$, then

(a) $p=\frac{1}{2}$ (b) $p=\frac{1}{3}$ (c) $p=\frac{1}{4}$ (d) None of these

**268.** If $x$ denotes the number of sixes in four consecutive throws of a dice, then $P(x=4)$ is

(a) 1/1296 (b) 4/6 (c) 1 (d) 1295/1296

**269.** The probability that an event will fail to happen is 0.05. The probability that the event will take place on 4 consecutive occasions is **[Roorkee 1990]**

(a) 0.00000625 (b) 0.18543125 (c) 0.00001875 (d) 0.81450625

**270.** A die is thrown three times. Getting a 3 or a 6 is considered success. Then the probability of at least two successes is **[DSSE 1981]**

(a) $\frac{2}{9}$ (b) $\frac{7}{27}$ (c) $\frac{1}{27}$ (d) None of these

**271.** Let $p$ be the probability of happening an event and $q$ its failure, then the total chance of $r$ successes in $n$ trials is **[MP PET 1999]**

(a) ${}^{n}C_{n+r}p^{r}q^{n-r}$ (b) ${}^{n}C_{r}p^{r-1}q^{r+1}$ (c) ${}^{n}C_{r}q^{n-r}p^{r}$ (d) ${}^{n}C_{r}p^{r+1}q^{r-1}$

**272.** In tossing 10 coins, the probability of getting exactly 5 heads is

(a) $\frac{9}{128}$ (b) $\frac{63}{256}$ (c) $\frac{1}{2}$ (d) $\frac{193}{256}$

**273.** Assuming that for a husband-wife couple the chances of their child being a boy or a girl are the same, the probability of their two children being a boy and a girl is

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

**274.** The probability that a student is not a swimmer is 1/5. What is the probability that out of 5 students, 4 are swimmers **[DCE 1999]**

(a) ${}^5C_4\left(\frac{4}{5}\right)^4\frac{1}{5}$ (b) $\left(\frac{4}{5}\right)^4\frac{1}{5}$ (c) ${}^5C_1\frac{1}{5}\left(\frac{4}{5}\right)^4\times{}^5C_4$ (d) None of these

**275.** Three coins are tossed together, then the probability of getting at least one head is **[Rajasthan PET 2001]**

(a) 1/2 (b) 3/4 (c) 1/8 (d) 7/8

**276.** A bag contains 2 white and 4 black balls. A ball is drawn 5 times with replacement. The probability that at least 4 of the balls drawn are white is

(a) $\frac{8}{141}$ (b) $\frac{10}{243}$ (c) $\frac{11}{243}$ (d) $\frac{8}{41}$

**277.** A die is tossed 5 times. Getting an odd number is considered a success. Then the variance of distribution of success is **[AIEEE 2002]**

(a) 8/3 (b) 3/8 (c) 4/5 (d) 5/4

**278.** A coin is tossed 10 times. The probability of getting exactly six heads is

(a) 512/513 (b) 105/512 (c) 100/153 (d) ${}^{10}C_6$

**279.** An experiment succeeds twice as often as it fails. Find the probability that in 4 trials there will be at least three success **[AMU 1999]**

(a) 4/27 (b) 8/27 (c) 16/27 (d) 24/27

**280.** The records of a hospital show that 10% of the cases of a certain disease are fatal. If 6 patients are suffering from the disease, then the probability that only three will die is

(a) $1458 \times 10^{-5}$ (b) $1458\times10^{-6}$ (c) $41\times10^{-6}$ (d) $8748\times10^{-5}$

**281.** If the probabilities of boy and girl to be born are same, then in a 4 children family the probability of being at least one girl, is

(a) $\frac{14}{16}$ (b) $\frac{15}{16}$ (c) $\frac{1}{8}$ (d) $\frac{3}{8}$

**282.** A committee has to be made of 5 members from 6 men and 4 women. The probability that at least one woman is present in committee, is

(a) $\frac{1}{42}$ (b) $\frac{41}{42}$ (c) $\frac{2}{63}$ (d) $\frac{1}{7}$

**283.** A die is tossed thrice. A success is getting 1 or 6 on a toss. The mean and the variance of number of successes **[AI CBSE**

(a) $\mu=1,\sigma^2=2/3$ (b) $\mu=2/3,\sigma^2=1$ (c) $\mu=2,\sigma^2=2/3$ (d) None of these

**284.** A coin is tossed 4 times. The probability that at least one head turns up is **[MP PET 2000]**

(a) 1/16 (b) 2/16 (c) 14/16 (d) 15/16

**285.** If a dice is thrown twice, the probability of occurrence of 4 at least once is **[UPSEAT 2003]**

(a) 11/36 (b) 7/12 (c) 35/36 (d) None of these

**286.** In a binomial distribution the probability of getting a success is 1/4 and standard deviation is 3, then its mean is **[EAMCET 2002]**

(a) 6 (b) 8 (c) 12 (d) 10

**287.** If two coins are tossed 5 times, then the probability of getting 5 heads and 5 tails is **AMU 2002]**

(a) $\frac{63}{256}$ (b) $\frac{1}{1024}$ (c) $\frac{2}{205}$ (d) $\frac{9}{64}$

**288.** 6 ordinary dice are rolled. The probability that at least half of them will show at least 3 is

(a) $41\times\frac{2^4}{3^6}$ (b) $\frac{2^4}{3^6}$ (c) $20\times\frac{2^4}{3^6}$ (d) None of these

**289.** 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

**290.** A fair coin is tossed a fixed number of times. If the probability of getting seven heads is equal to that of getting nine heads, the probability of getting two heads is

(a) $15/2^8$ (b) $2/15$ (c) $15/2^{13}$ (d) None of these

**291.** The probability that a candidate secures a seat in Engineering through "EAMCET" is 1/10. 7 candidates are selected at random from a centre. The probability that exactly two will get seats is

(a) $15(0.1)^2(0.9)^5$ (b) $20(0.1)^2(0.9)^5$ (c) $21(0.1)^2(0.9)^5$ (d) $23(0.1)^2(0.9)^5$

**292.** The probability that a man can hit a target is 3/4. He tries 5 times. The probability that he will hit the target at least three times is **[MNR 1994]**

(a) 291/364 (b) 371/464

(c) 471/502 (d) 459/512

**293.** A fair coin is tossed 100 times. The probability of getting tails an odd number of times is

(a) 1/2 (b) 1/8 (c) 3/8 (d) None of these

**294.** A coin is tossed 7 times. Each time a man calls head. The probability that he wins the toss on more occasions is

(a) $\frac{1}{4}$ (b) $\frac{5}{8}$ (c) $\frac{1}{2}$ (d) None of these

**295.** A man draws a card from a pack of 52 cards and then replaces it. After shuffling the pack, he again draws a card. This he repeats a number of times. The probability that he will draw a heart for the first time in the third draw is

(a) $\frac{9}{64}$ (b) $\frac{27}{64}$ (c) $\frac{1}{4}\times\frac{^{39}C_2}{^{52}C_2}$ (d) None of these

## *Advance Level*

**296.** A fair coin is tossed $n$ times. Let $X$ be the number of times head is observed. If $P(X=4), P(X=5)$ and $P(X=6)$ are in H.P., then $n$ is equal to

(a) 7 (b) 10 (c) 14 (d) None of these

**297.** Five coins whose faces are marked 2, 3 are tossed. The chance of obtaining a total of 12 is

(a) $\frac{1}{32}$ (b) $\frac{1}{16}$ (c) $\frac{3}{16}$ (d) $\frac{5}{16}$

**298.** A coin is tossed $2n$ times. The chance that the number of times one gets head is not equal to the number of times one gets tail is **[DCE 2002]**

(a) $\frac{(2n!)}{(n!)^2}\left(\frac{1}{2}\right)^{2n}$ (b) $1-\frac{(2n!)}{(n!)^2}$ (c) $1-\frac{(2n!)}{(n!)^2}\cdot\frac{1}{4^n}$ (d) None of these

**299.** A coin is tossed $n$ times. The probability of getting head at least once is greater than 0.8, then the least value of $n$ is **[EAMCET 2003]**

(a) 2 (b) 3 (c) 4 (d) 5

**300.** A box contains 24 identical balls, of which 12 are white and 12 are black. The balls are drawn at random from the box one at a time with replacement. The probability that a white ball is drawn for the $4^{th}$ time on the $7^{th}$ draw is **[IIT Screening 1994]**

(a) 5/64 (b) 27/32 (c) 5/32 (d) 1/2

**301.** A die is tossed twice. Getting a number greater than 4 is considered a success. Then the variance of the probability distribution of the number of successes is

(a) $\frac{2}{9}$ (b) $\frac{4}{9}$ (c) $\frac{1}{3}$ (d) None of these

**302.** In order to get at least once a head with probability $\geq 0.9$, the number of times a coin needs to be tossed is **[Roorkee 19**

(a) 3 (b) 4 (c) 5 (d) None of these

**303.** India plays two matches each with West Indies and Australia. In any match the probabilities of India getting point 0, 1 and 2 are 0.45, 0.05 and 0.50 respectively. Assuming that the outcomes are independent, the probability of India getting at least 7 points is **[IIT 1992]**

(a) 0.8750 (b) 0.0875 (c) 0.0625 (d) 0.0250

**304.** In a box of 10 electric bulbs, two are defective. Two bulbs are selected at random one after the other from the box. The first bulb after selection being put back in the box before making the second selection. The probability that both the bulbs are without defect is

**[MP PET 1987]**

(a) 9/25 (b) 16/25 (c) 4/5 (d) 8/25

**305.** If the mean and variance of a binomial variate $X$ are 2 and 1 respectively, then the probability that $X$ takes a value greater than 1, is

(a) $\frac{2}{3}$ (b) $\frac{4}{5}$ (c) $\frac{7}{8}$ (d) $\frac{15}{16}$

**306.** A die is tossed thrice. If getting a four is considered a success, then the mean and variance of the probability distribution of the number of successes are

(a) $\frac{1}{2},\frac{1}{12}$ (b) $\frac{1}{6},\frac{5}{12}$ (c) $\frac{5}{6},\frac{1}{2}$ (d) None of these

**307.** Suppose $A$ and $B$ shoot independently until each hits his target. They have probabilities 3/5, 5/7 of hitting the targets at each shot. The probability that $B$ will require more shots than $A$ is

(a) 6/31 (b) 7/31 (c) 8/31 (d) None of these

**308.** A fair coin is tossed $n$ times. Let $X$ be the number of times head occurs. If $P(X=4), P(X=5)$ and $P(X=6)$ are in A.P., then value of $n$ is

(a) 7 (b) 10 (c) 12 (d) 14

**309.** In a precision bombing attack there is a 50% chance that any one bomb will strike the target. Two direct hits are required to destroy the target completely. The minimum number of bombs which should be dropped to give a 99% chance or better of completely destroying the target is

(a) 10 (b) 11 (c) 12 (d) None of these

**310.** If the mean of a binomial distribution is 25, then its standard deviation lies in the interval given below

(a) [0, 5) (b) (0, 5] (c) [0, 25) (d) (0, 25]

**311.** If $n$ integers taken at random are multiplied together, then the probability that the last digit of the product is 1, 3, 7 or 9 is

(a) $\frac{2^n}{5^n}$ (b) $\frac{8^n-2^n}{5^n}$ (c) $\frac{4^n-2^n}{5^n}$ (d) None of these

**312.** A bag contains 14 balls of two colours, the number of balls of each colour being the same. 7 balls are drawn at random one by one. The ball in hand is returned to the bag before each new draw. If the probability that at least 3 balls of each colour are drawn is $p$ then

(a) $p>\frac{1}{2}$ (b) $p=\frac{1}{2}$ (c) $p<1$ (d) $p<\frac{1}{2}$

**313.** An ordinary dice is rolled a certain number of times. The probability of getting an odd number 2 times is equal to the probability of getting an even number 3 times. Then the probability of getting an odd number an odd number of times is

(a) $\frac{1}{32}$ (b) $\frac{5}{16}$ (c) $\frac{1}{2}$ (d) None of these

**314.** The probability of a bomb hitting a bridge is $\frac{1}{2}$ and two direct hits are needed to destroy it. The least number of bombs required so that the probability of the bridge being destroyed is greater than 0.9, is

(a) 8 (b) 7 (c) 6 (d) 9

**315.** All the spades are taken out from a pack of cards. From these cards, cards are drawn one by one without replacement till the ace of spade comes. The probability that the ace comes in the $4^{th}$ draw is

(a) $\frac{1}{13}$ (b) $\frac{12}{13}$ (c) $\frac{4}{13}$ (d) None of these

# Answer Sheet

***Probability*** ***Assignment (Basic and Advance Level)***

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d | c | b | b | b | c | d | b | d | b | a | d | a | b | b | c | d | a | a | b |
| **21** | **22** | **23** | **24** | **25** | **26** | **27** | **28** | **29** | **30** | **31** | **32** | **33** | **34** | **35** | **36** | **37** | **38** | **39** | **40** |
| d | b | c | c | c | b | a | c | c | c | b | b | d | b | c | b | b | c | b | b |
| **41** | **42** | **43** | **44** | **45** | **46** | **47** | **48** | **49** | **50** | **51** | **52** | **53** | **54** | **55** | **56** | **57** | **58** | **59** | **60** |
| a | d | b | a | c | b | b | b | d | c | b | b | b | a | b | c | b | c | b | b |
| **61** | **62** | **63** | **64** | **65** | **66** | **67** | **68** | **69** | **70** | **71** | **72** | **73** | **74** | **75** | **76** | **77** | **78** | **79** | **80** |
| a | a | c | a | a | a | a | a | c | d | b | b | a | a | b | b | d | a | c | b |
| **81** | **82** | **83** | **84** | **85** | **86** | **87** | **88** | **89** | **90** | **91** | **92** | **93** | **94** | **95** | **96** | **97** | **98** | **99** | **100** |
| a,b | b | c | b | c | d | a | b | b | a | b | d | a,b, c | a,b, c,d | a,b, c,d | a,c | b | d | c | b |
| **101** | **102** | **103** | **104** | **105** | **106** | **107** | **108** | **109** | **110** | **111** | **112** | **113** | **114** | **115** | **116** | **117** | **118** | **119** | **120** |
| a | a | a | a,c | b | b | b | b | c | d | a | c | d | c | a | b | c | b | b | c |
| **121** | **122** | **123** | **124** | **125** | **126** | **127** | **128** | **129** | **130** | **131** | **132** | **133** | **134** | **135** | **136** | **137** | **138** | **139** | **140** |
| c | c | b | b | d | b | c | c | a | c | a | d | b | d | b | b | a | b | b | a |
| **141** | **142** | **143** | **144** | **145** | **146** | **147** | **148** | **149** | **150** | **151** | **152** | **153** | **154** | **155** | **156** | **157** | **158** | **159** | **160** |
| b | c | b | c | d | c | d | c | c | d | a | c | d | b | c | a | b | c | c | a |
| **161** | **162** | **163** | **164** | **165** | **166** | **167** | **168** | **169** | **170** | **171** | **172** | **173** | **174** | **175** | **176** | **177** | **178** | **179** | **180** |
| c | d | d | a | a | a | b | a | c,d | d | b | a | d | c | b | d | a,b, c | c | d | d |
| **181** | **182** | **183** | **184** | **185** | **186** | **187** | **188** | **189** | **190** | **191** | **192** | **193** | **194** | **195** | **196** | **197** | **198** | **199** | **200** |
| a | b | d | a | d | c | b | a | c | a | a,b,c, d | a | b | b | a | a | a | a | c | c |
| **201** | **202** | **203** | **204** | **205** | **206** | **207** | **208** | **209** | **210** | **211** | **212** | **213** | **214** | **215** | **216** | **217** | **218** | **219** | **220** |
| a | b | c | a | d | d | c | c | d | d | a | c | a | d | a | c | c | b | d | d |
| **221** | **222** | **223** | **224** | **225** | **226** | **227** | **228** | **229** | **230** | **231** | **232** | **233** | **234** | **235** | **236** | **237** | **238** | **239** | **240** |
| a | b | b | a | d | c | a | a,b,c, d | b | a | c | c | c | a | d | a,d | a | b | c,d | d |
| **241** | **242** | **243** | **244** | **245** | **246** | **247** | **248** | **249** | **250** | **251** | **252** | **253** | **254** | **255** | **256** | **257** | **258** | **259** | **260** |
| d | d | a | a,b,c, d | b | c | b | c | b | c | c | b | d | a | a | a | d | b | b | c |
| **261** | **262** | **263** | **264** | **265** | **266** | **267** | **268** | **269** | **270** | **271** | **272** | **273** | **274** | **275** | **276** | **277** | **278** | **279** | **280** |
| a | b | b | a | d | a | a | a | d | b | c | b | c | a | d | c | d | b | c | a |
| **281** | **282** | **283** | **284** | **285** | **286** | **287** | **288** | **289** | **290** | **291** | **292** | **293** | **294** | **295** | **296** | **297** | **298** | **299** | **300** |
| b | b | a | d | a | c | a | a | b | c | c | d | a | c | a | d | d | c | b | c |
| **301** | **302** | **303** | **304** | **305** | **306** | **307** | **308** | **309** | **310** | **311** | **312** | **313** | **314** | **315** | | | | | |
| b | b | b | b | d | d | a | a | b | a | a | a | c | a | a | | | | | |