|  |
| --- |
| ..  Probability-1 |
| Proability : A mathematically measure of uncertainty is known as probability.  Random Experiment : An experiment in which all possible outcomes are known and exact outcome can be not be predicted, is called a random experiment.  Eg. Rolling an unbiased dice has all six outcomes (1, 2, 3, 4, 5, 6 ) known but exact outcome can be predicted.  Outcome : The result of a random experiment is called an outcome.  Sample Space : The set of all possible outcomes of a random experiment is known as sample space.  eg . The sample space in throwing of a dice is the set (1, 2, 3, 4, 5, 6 )  Trial : The performance of a random experiment is called a trial.  eg. The tossing of a coin is called trial  Event : An event is a set of experimental outcomes, or in other words it is a subset of sample space.   eg. On tossing of a dice, let A denotes the event of even number appers on top A : { 2, 4, 6 }  Mutually Exclusive Events : Two or more events are said to be mutually exclusive if the occurence of any one excludes the happening of other in the same experiment.  eg. On tossing of a coin it head occur, then it prevents happing of tail, in the same single experiment.  Exhaustive Events : All possile outcomes of an event are known as exhaustive events.  eg. In a through of single dice the exhaustive events are six { 1, 2, 3, 4, 5, 6 }  Equally Likely Event : Two or more events are said to be equally likely if the chances of their happening are equal.  eg. In throwing of an unbiased coin, result of Heat and Tail is equally likely.  Playing Cards :   (1) Total number of card are 52.  (2) There are 13 cards of each suit named Diamond, Hearts, Clubs and Spades  (3) Out of which Hearts and diamonds are red cards.  (4) Spades and Clubs are black cards  (5) There are four face cards each in number four Ace, King, Queen and Jack   |  |  | | --- | --- | | Black Suit (26) | Red Suit (26) | | |  |  | | --- | --- | | Spade (13) | Club(13) | | |  |  | | --- | --- | | Diamond (13) | Heart (13) | |   (6) Each Spade, Club, Diamond, Heart has 9 digit cards 2, 3, 4, 5, 6, 7, 8, 9 and 10  (7) There are 4 Honour cards each Spade, Club, Diamond, Heart contains 4 numbers of Honours cards Ace, King, Queen and Jack   Probability of Occurence of an Event :  If S be the sample space and let E be the event then :   Probability concepts  (a) P (S) = 1  (b) P (Ø) = 0  Probability  (d) For any events A and B   Probability |

|  |  |  |  |
| --- | --- | --- | --- |
| Probability Part 2:                                                                Next- [Probability-3](http://www.vidyatutorial.com/Probability-3.html) | | | |
| Ex. In a through of a coin find the probability of getting a tail.  Solution : In this case sample space, S = { H, T } , Event E = { T }  Probability problems  Ex. An unbiased die is tossed. Find the probability of getting of getting a multiple of 2.  Solution : Here Sample space S = { 1, 2, 3, 4, 5, 6 }, Event E = { 2, 4, 6 } multiple of 2  Probability problems  Ex. An unbiased die is tossed. Find the probability of getting a number less than or equal to 4.  Solution : Here Sample space S = { 1, 2, 3, 4, 5, 6 }, Event E = { 1, 2, 3, 4 } number less than or equal to 4.  Probability problems  Ex. Two coins are tossed. What is the probability of getting  (a) At most one head ?  Solution : n(S) = { (HH), (HT), (TH), (TT) } = 4  n(E) = { HT, TH, TT } = 3 at most one head  Probability problems  (b) At most two heads ?  Solution : n(S) = { (HH), (HT), (TH), (TT) } = 4  n(E) = { (HH), (HT), (TH), (TT) }= 4  Probability problems  Ex. What is the chance that a leap year selected randomly will will have 53 sundays ?  Solution : A leap year has 366 days, out of which there are 52 weeks and 2 more days.  2 more days can be (Sunday, Monday) (Monday, Tuesday) (Tuesday, Wednesday) (Wednesday, Thrusday) (Thrusday, Friday) (Friday, Saturday) (Saturday, Sunday) = n(S) = 7  So, (Sunday, Monday) and (Saturday, Sunday) = n(E) = 2, therefore chances that a leap year selected randomly will will have 53 sundays:  Probability questions  Ex. What is the chance that a normal year selected randomly will will have 53 sundays ?  Solution : A normal year has 365 days, out of which there are 52 weeks and 1 more day  So, extra day can be Sunday, Monday, Tuesday, Wednesday, Thrusday, Friday, Saturday   So, n(S) = 7 , n (E) = 1  Probability problems  Ex. When two dice are thrown, what is the probability that   (a) Sum of numbers appeared is less than equal to 4  Solution : E = { (1,1) (1,2) (1,3) (2,1) (2,2) (3,1) }  n(E) = 6 and n(S) = 36   Probability problems  (b) Sum of numbers is a multiple of 4  Solution : E= { (1,3) (2,2) (2,6) (3,1) (3,5) (4,4) (5,3) (6,2) (6, 6) }  n(E) = 9, n (S) = 36  Probability problems  (c) Numbers appeared are equal  Solution : E = { (1,1) (2,2) (3,3) (4,4) (5,5) (6,6) }  n(E) = 6, n(S) = 36  Probability problems | | | |
| Probability Part 3:                                                              Next- [Probability-4](http://www.vidyatutorial.com/Probability-4.html) | | | |
|  | | | |
| Ex. A card is drawn at random from a pack of 52 cards, What is the probability that it is  (a) A card of Red Suit ?  Solution : There are 26 cards of Red Suit   Probability Questions  Probability Tutorial  (b) An honour card of Black suit ?  Solution : There are 16 honour cards out of which 8 are of Black suit and 8 are of Red Suit. So n(E) = 8 , n(S)=52  Probability Theory  (c) A card is drawn and its number is multiple of 2  Solution : E = 4 (2)'s + 4 (4)'s + 4 (6)'s + 4 (8)'s + 4 (10)'s  So, n(E) = 20, n (S) = 52   Probability Concepts and tutorials  (d) A king or a queen ?  Solution : There are 4 kings and 4 Queens in 52 cards  Probability questions for examinations   (e) A king of black suit ?  Solution : There are 2 kings in black suit ( King of Spade and King of Club )  Probability questions  Ex. A bag contains 4 red, 3 yellow and 5 green balls. 3 balls are drawn randomly. What is the probability that balls drawn contain  (a) Balls of different colors ?  Solution : Toatal numbers of balls = 12  Probability problems asked in PSU  Probability problems asked in Bank PO exam  Probability problems asked in Government Jobs    (b) Exactly two Red Balls ?  Solution : Here only three balls are to be drawn out of which condition is of Exactly two Red balls,   Probability theory  Probability tutorial  Probability problems asked in PSU   (c) No Red balls ?  Solution : Now three balls can be selected from 3 Y + 5 G balls  Probability problems asked in Bank PO exam  Ex. A bag contains 4 Red balls and 5 Green balls. Two balls are drawn at random. Find the probability that they are of the same colour ?  Solution : Let S be the sample space and E be the event, so  Probability tutorial  n(E) = ( Number of ways of drawing 2 balls of Red ) OR ( Number of ways of drawing 2 balls of Green )  Probability problems asked in PSU  Probability problems asked in Government Jobs  Ex. A three-digit number is formed with the digits 1, 2, 3, 4, 5 at random. What is probability that number formed is   (a) Divisible by 2  Solution : From the given digits 1, 2, 3, 4, 5 numbers formed is :  Probability problems asked in Bank Jobs  For divisibility with 2, even number or 0 should appear at unit place, here 2, 4 are even numbers and can occupy unit place in 2 ! ways, Rest 2 place can be filled in : Probability theory  Probability tutorial  Probability problems asked in PSU  Ex. Not divisible by 2 ?  Solution : P (Not divisible by 2 ) = 1 - P (Divisible by 2 )  Probability problems asked in Government Jobs  Ex. Divisible by 5 ?  Solution : A number ends with 5, 0 then the number will be divisible by 5 Here only 5 is present, end place will be fixed by 5 so,   Probability problems  Probabilty questions  Ex. The letters of the word CASTIGATION is arranged in different ways randomly. What is the chance that vowels occupy the even places ?  Solution : Vowels are A I A I O,    C   A   S   T   I   G   A   T   I   O   N (O)(E)(O)(E)(O)(E)(O)(E)(O)(E)(O)  So there are 5 even places in which five vowels can be arranged and in rest of 6 places 6 constants can be arranged as follows :  Probability questions asked in compititions   Best probability problems   Quality probability problems | | | |
| Probability Part-4                                                Next- [Profit and Loss Part 1](http://www.vidyatutorial.com/ProfitAndLossPart-1.html) | | | |
| Addition Rule :  (1) If A and B are any two events then the probability of the occurrence of either A or B is given by :                           Probability addition rule  (2) If A and B are two mutually exclusive events then the probability of occurence of either A or B is given by :                           Probability for mutually exclusive events  (3) If A, B and C are any three events then the probability of occurrence of either A or B or C is given by :   http://www.vidyatutorial.com/images/Probability-4_clip_image002_0001.gif  (4) If A1, A2, A3 ..........An are n mutually exclusive and exhaustive events then the proability of occurrence of at least one of them is given by :  Probability of n mutually exclusive events  Multiplication rule :  If A and B are two indepentent events then the probability of occurrence of A and B is given by :            Multiplication rule of two independents events  Conditional Probability :  Conditional probability of occurrence of an event A given that the event B has already occurred is denoted by P (A / B ). Here A and B are depedent events.  If A and B are dependent events, then the probability of occurrence of A and B is given by :  Conditional probability  Now we can write as : probability of occurrence of an event A given that the event B has already occurred        Conditional proability  Probability of occurrence of an event B given that the event A has already occurred :       Conditional probability  Ex. A number is selected at random from the numbers 1 to 30. What is the probability that it is divisible by either 3 or 7 ?  Solution : Let A be event of selecting a number divisible by 3. B be the event of selecting a number divisible by 7.    Proability tutorial   A = { 3, 6, 9, 12, 15, 18, 21, 24, 27, 30 }, so n(A)=10  B = { 7, 14, 21, 28 }, n(B)= 4   Probability problems   Since A and B are not mutually exclusive So :  Probability addition rule  Probability problems  Therefore the probability that a number is divisible by 3 or 7 is 13 / 30  Ex. In the above problem what is the probability that the number selected is divisible by 5 or 13 ?  Solution : Let A be event of selecting a number divisible by 5. B be the event of selecting a number divisible by 13    Proability tutorial   A = { 5, 10, 15, 20, 25, 30 } , n (A) = 6    B = { 13, 26 }, n (B) = 2   Tutorial probability   Probability for mutually exclusive events  Probability problems asked in Government Jobs  So, probability that a number is divisible by 5 or 13 is 4 / 15  Ex. The odds favouring the event of a person hitting a target are 3 to 5. The odds against the event of another person hitting the target are 3 to 2. If each of them fire once at the target, find the probability that both of them hit the target.  Solution : Let A be the event of first person hitting the target,     Probability problems asked in PSU  Let B be the event of Second person hitting a target.     Probability problems asked in Bank PO exam  Since both events are independent and both will hit the target so,   Probability theory  Ex. In the above example find the probability that at least one one of them hit the target.   Solution : For At least one one of them hit the target.     Probability addition rule     Probability tutorial  Ex. The probabilities that drivers A, B and C will drive home safely after consuming liquor are 2 / 5 , 3 / 7 and 3 / 4, respectively. What is the probability that they will drive home safely after consuming liquor ?  Solution : Let A be the event of driver A drive safely after consuming liquor.   Let B be the event of driver B drive safely after consuming liquor.   Let C be the event of driver C drive safely after consuming liquor.   Probability of independent events  The events A, B and C are independent . Therefore,   Probability for independent events  Therefore, The probability that all the drivers will drive home safely after consuming liquor is 9 / 10  Ex. The probabilities that A and B will tell the truth are 2 / 3 and 4 / 5 respectively . What is the probability that they agree with each other ?  Solution : Let A be the event of A will tell truth. B be the event of B tell truth  Probability problems  Probability tutorial  When both agree then they say true or they say false together, that is   Probability theory  Also these events will be mutually exclusive :  Probability tutorial  Ex. In the above problem find out the probability that both contradict each other ?  Solution : They will contradict if A tells truth and B tells lies or B tells truth and A tells lies, So  Probability tutorial  Since these events are mutually exclusively  Probability theory  probability tutorial   |  |  | | --- | --- | | 1. | From a group of 7 men and 6 women, five persons are to be selected to form a committee so that at least 3 men are there on the committee. In how many ways can it be done? | | |  |  |  |  | | --- | --- | --- | --- | | [A.](javascript:%20void%200;) | 564 | [B.](javascript:%20void%200;) | 645 | | [C.](javascript:%20void%200;) | 735 | [D.](javascript:%20void%200;) | 756 | | [E.](javascript:%20void%200;) | None of these |  |  |   [Answer & Explanation](javascript:%20void%200;)  Answer: Option D  Explanation:  We may have (3 men and 2 women) or (4 men and 1 woman) or (5 men only).   |  |  | | --- | --- | | http://www.indiabix.com/_files/images/aptitude/1-sym-tfr.gif Required number of ways | = (7C3 x 6C2) + (7C4 x 6C1) + (7C5) | |  | |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | = | http://www.indiabix.com/_files/images/aptitude/1-sym-oparen-h1.gif | 7 x 6 x 5 | x | 6 x 5 | http://www.indiabix.com/_files/images/aptitude/1-sym-cparen-h1.gif | + (7C3 x 6C1) + (7C2) | | 3 x 2 x 1 | 2 x 1 | | |  | |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | = 525 + | http://www.indiabix.com/_files/images/aptitude/1-sym-oparen-h1.gif | 7 x 6 x 5 | x 6 | http://www.indiabix.com/_files/images/aptitude/1-sym-cparen-h1.gif | + | http://www.indiabix.com/_files/images/aptitude/1-sym-oparen-h1.gif | 7 x 6 | http://www.indiabix.com/_files/images/aptitude/1-sym-cparen-h1.gif | | 3 x 2 x 1 | 2 x 1 | | |  | = (525 + 210 + 21) | |  | = 756. |   [View Answer](javascript:%20void%200;) [Workspace](javascript:%20void%200;) [Report](javascript:%20void%200;) [Discuss in Forum](http://www.indiabix.com/aptitude/permutation-and-combination/discussion-683) |  |  |  | | --- | --- | | 2. | In how many different ways can the letters of the word 'LEADING' be arranged in such a way that the vowels always come together? | | |  |  |  |  | | --- | --- | --- | --- | | [A.](javascript:%20void%200;) | 360 | [B.](javascript:%20void%200;) | 480 | | [C.](javascript:%20void%200;) | 720 | [D.](javascript:%20void%200;) | 5040 | | [E.](javascript:%20void%200;) | None of these |  |  |   [Answer & Explanation](javascript:%20void%200;)  Answer: Option C  Explanation:  The word 'LEADING' has 7 different letters.  When the vowels EAI are always together, they can be supposed to form one letter.  Then, we have to arrange the letters LNDG (EAI).  Now, 5 (4 + 1 = 5) letters can be arranged in 5! = 120 ways.  The vowels (EAI) can be arranged among themselves in 3! = 6 ways.  http://www.indiabix.com/_files/images/aptitude/1-sym-tfr.gif Required number of ways = (120 x 6) = 720.  [View Answer](javascript:%20void%200;) [Workspace](javascript:%20void%200;) [Report](javascript:%20void%200;) [Discuss in Forum](http://www.indiabix.com/aptitude/permutation-and-combination/discussion-677) |  |  |  | | --- | --- | | 3. | In how many different ways can the letters of the word 'CORPORATION' be arranged so that the vowels always come together? | | |  |  |  |  | | --- | --- | --- | --- | | [A.](javascript:%20void%200;) | 810 | [B.](javascript:%20void%200;) | 1440 | | [C.](javascript:%20void%200;) | 2880 | [D.](javascript:%20void%200;) | 50400 | | [E.](javascript:%20void%200;) | 5760 |  |  |   [Answer & Explanation](javascript:%20void%200;)  Answer: Option D  Explanation:  In the word 'CORPORATION', we treat the vowels OOAIO as one letter.  Thus, we have CRPRTN (OOAIO).  This has 7 (6 + 1) letters of which R occurs 2 times and the rest are different.   |  |  |  | | --- | --- | --- | | Number of ways arranging these letters = | 7! | = 2520. | | 2! |   Now, 5 vowels in which O occurs 3 times and the rest are different, can be arranged   |  |  |  | | --- | --- | --- | | in | 5! | = 20 ways. | | 3! |   http://www.indiabix.com/_files/images/aptitude/1-sym-tfr.gif Required number of ways = (2520 x 20) = 50400.  [View Answer](javascript:%20void%200;) [Workspace](javascript:%20void%200;) [Report](javascript:%20void%200;) [Discuss in Forum](http://www.indiabix.com/aptitude/permutation-and-combination/discussion-678) |  |  |  | | --- | --- | | 4. | Out of 7 consonants and 4 vowels, how many words of 3 consonants and 2 vowels can be formed? | | |  |  |  |  | | --- | --- | --- | --- | | [A.](javascript:%20void%200;) | 210 | [B.](javascript:%20void%200;) | 1050 | | [C.](javascript:%20void%200;) | 25200 | [D.](javascript:%20void%200;) | 21400 | | [E.](javascript:%20void%200;) | None of these |  |  |   [Answer & Explanation](javascript:%20void%200;)  Answer: Option C  Explanation:  Number of ways of selecting (3 consonants out of 7) and (2 vowels out of 4)   |  |  | | --- | --- | |  | = (7C3 x 4C2) | |  | |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | = | http://www.indiabix.com/_files/images/aptitude/1-sym-oparen-h1.gif | 7 x 6 x 5 | x | 4 x 3 | http://www.indiabix.com/_files/images/aptitude/1-sym-cparen-h1.gif | | 3 x 2 x 1 | 2 x 1 | | |  | = 210. |   Number of groups, each having 3 consonants and 2 vowels = 210.  Each group contains 5 letters.   |  |  | | --- | --- | | Number of ways of arranging  5 letters among themselves | = 5! | |  | = 5 x 4 x 3 x 2 x 1 | |  | = 120. |   http://www.indiabix.com/_files/images/aptitude/1-sym-tfr.gif Required number of ways = (210 x 120) = 25200.  [View Answer](javascript:%20void%200;) [Workspace](javascript:%20void%200;) [Report](javascript:%20void%200;) [Discuss in Forum](http://www.indiabix.com/aptitude/permutation-and-combination/discussion-688) |  |  |  | | --- | --- | | 5. | In how many ways can the letters of the word 'LEADER' be arranged? | | |  |  |  |  | | --- | --- | --- | --- | | [A.](javascript:%20void%200;) | 72 | [B.](javascript:%20void%200;) | 144 | | [C.](javascript:%20void%200;) | 360 | [D.](javascript:%20void%200;) | 720 | | [E.](javascript:%20void%200;) | None of these |  |  |   [Answer & Explanation](javascript:%20void%200;)  Answer: Option C  Explanation:  The word 'LEADER' contains 6 letters, namely 1L, 2E, 1A, 1D and 1R.   |  |  |  | | --- | --- | --- | | http://www.indiabix.com/_files/images/aptitude/1-sym-tfr.gif Required number of ways = | 6! | = 360. | | (1!)(2!)(1!)(1!)(1!) | | | | | |
| 6. | In a group of 6 boys and 4 girls, four children are to be selected. In how many different ways can they be selected such that at least one boy should be there? |
| |  |  |  |  | | --- | --- | --- | --- | | [A.](javascript:%20void%200;) | 159 | [B.](javascript:%20void%200;) | 194 | | [C.](javascript:%20void%200;) | 205 | [D.](javascript:%20void%200;) | 209 | | [E.](javascript:%20void%200;) | None of these |  |  |   [Answer & Explanation](javascript:%20void%200;)  Answer: Option D  Explanation:  We may have (1 boy and 3 girls) or (2 boys and 2 girls) or (3 boys and 1 girl) or (4 boys).   |  |  | | --- | --- | | http://www.indiabix.com/_files/images/aptitude/1-sym-tfr.gif Required number of ways | = (6C1 x 4C3) + (6C2 x 4C2) + (6C3 x 4C1) + (6C4) | |  | = (6C1 x 4C1) + (6C2 x 4C2) + (6C3 x 4C1) + (6C2) | |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | = (6 x 4) + | http://www.indiabix.com/_files/images/aptitude/1-sym-oparen-h1.gif | 6 x 5 | x | 4 x 3 | http://www.indiabix.com/_files/images/aptitude/1-sym-cparen-h1.gif | + | http://www.indiabix.com/_files/images/aptitude/1-sym-oparen-h1.gif | 6 x 5 x 4 | x 4 | http://www.indiabix.com/_files/images/aptitude/1-sym-cparen-h1.gif | + | http://www.indiabix.com/_files/images/aptitude/1-sym-oparen-h1.gif | 6 x 5 | http://www.indiabix.com/_files/images/aptitude/1-sym-cparen-h1.gif | | 2 x 1 | 2 x 1 | 3 x 2 x 1 | 2 x 1 | | |  | = (24 + 90 + 80 + 15) | |  | = 209. |   [View Answer](javascript:%20void%200;) [Workspace](javascript:%20void%200;) [Report](javascript:%20void%200;) [Discuss in Forum](http://www.indiabix.com/aptitude/permutation-and-combination/discussion-684) |

|  |  |
| --- | --- |
| 7. | How many 3-digit numbers can be formed from the digits 2, 3, 5, 6, 7 and 9, which are divisible by 5 and none of the digits is repeated? |
| |  |  |  |  | | --- | --- | --- | --- | | [A.](javascript:%20void%200;) | 5 | [B.](javascript:%20void%200;) | 10 | | [C.](javascript:%20void%200;) | 15 | [D.](javascript:%20void%200;) | 20 |   [Answer & Explanation](javascript:%20void%200;)  Answer: Option D  Explanation:  Since each desired number is divisible by 5, so we must have 5 at the unit place. So, there is 1 way of doing it.  The tens place can now be filled by any of the remaining 5 digits (2, 3, 6, 7, 9). So, there are 5 ways of filling the tens place.  The hundreds place can now be filled by any of the remaining 4 digits. So, there are 4 ways of filling it.  http://www.indiabix.com/_files/images/aptitude/1-sym-tfr.gif Required number of numbers = (1 x 5 x 4) = 20.  [View Answer](javascript:%20void%200;) [Workspace](javascript:%20void%200;) [Report](javascript:%20void%200;) [Discuss in Forum](http://www.indiabix.com/aptitude/permutation-and-combination/discussion-686) |

|  |  |
| --- | --- |
| 8. | In how many ways a committee, consisting of 5 men and 6 women can be formed from 8 men and 10 women? |
| |  |  |  |  | | --- | --- | --- | --- | | [A.](javascript:%20void%200;) | 266 | [B.](javascript:%20void%200;) | 5040 | | [C.](javascript:%20void%200;) | 11760 | [D.](javascript:%20void%200;) | 86400 | | [E.](javascript:%20void%200;) | None of these |  |  |   [Answer & Explanation](javascript:%20void%200;)  Answer: Option C  Explanation:   |  |  | | --- | --- | | Required number of ways | = (8C5 x 10C6) | |  | = (8C3 x 10C4) | |  | |  |  |  |  |  | | --- | --- | --- | --- | --- | | = http://www.indiabix.com/_files/images/aptitude/1-sym-oparen-h1.gif | 8 x 7 x 6 | x | 10 x 9 x 8 x 7 | http://www.indiabix.com/_files/images/aptitude/1-sym-cparen-h1.gif | | 3 x 2 x 1 | 4 x 3 x 2 x 1 | | |  | = 11760. |   [View Answer](javascript:%20void%200;) [Workspace](javascript:%20void%200;) [Report](javascript:%20void%200;) [Discuss in Forum](http://www.indiabix.com/aptitude/permutation-and-combination/discussion-682) |

|  |  |
| --- | --- |
| 9. | A box contains 2 white balls, 3 black balls and 4 red balls. In how many ways can 3 balls be drawn from the box, if at least one black ball is to be included in the draw? |
| |  |  |  |  | | --- | --- | --- | --- | | [A.](javascript:%20void%200;) | 32 | [B.](javascript:%20void%200;) | 48 | | [C.](javascript:%20void%200;) | 64 | [D.](javascript:%20void%200;) | 96 | | [E.](javascript:%20void%200;) | None of these |  |  |   [Answer & Explanation](javascript:%20void%200;)  Answer: Option C  Explanation:  We may have(1 black and 2 non-black) or (2 black and 1 non-black) or (3 black).   |  |  | | --- | --- | | http://www.indiabix.com/_files/images/aptitude/1-sym-tfr.gif Required number of ways | = (3C1 x 6C2) + (3C2 x 6C1) + (3C3) | |  | |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | = | http://www.indiabix.com/_files/images/aptitude/1-sym-oparen-h1.gif | 3 x | 6 x 5 | http://www.indiabix.com/_files/images/aptitude/1-sym-cparen-h1.gif | + | http://www.indiabix.com/_files/images/aptitude/1-sym-oparen-h1.gif | 3 x 2 | x 6 | http://www.indiabix.com/_files/images/aptitude/1-sym-cparen-h1.gif | + 1 | | 2 x 1 | 2 x 1 | | |  | = (45 + 18 + 1) | |  | = 64. |   [View Answer](javascript:%20void%200;) [Workspace](javascript:%20void%200;) [Report](javascript:%20void%200;) [Discuss in Forum](http://www.indiabix.com/aptitude/permutation-and-combination/discussion-685) |

|  |  |
| --- | --- |
| 10. | In how many different ways can the letters of the word 'DETAIL' be arranged in such a way that the vowels occupy only the odd positions? |
| |  |  |  |  | | --- | --- | --- | --- | | [A.](javascript:%20void%200;) | 32 | [B.](javascript:%20void%200;) | 48 | | [C.](javascript:%20void%200;) | 36 | [D.](javascript:%20void%200;) | 60 | | [E.](javascript:%20void%200;) | 120 |  |  |   [Answer & Explanation](javascript:%20void%200;)  Answer: Option C  Explanation:  There are 6 letters in the given word, out of which there are 3 vowels and 3 consonants.  Let us mark these positions as under:  (1) (2) (3) (4) (5) (6)  Now, 3 vowels can be placed at any of the three places out 4, marked 1, 3, 5.  Number of ways of arranging the vowels = 3P3 = 3! = 6.  Also, the 3 consonants can be arranged at the remaining 3 positions.  Number of ways of these arrangements = 3P3 = 3! = 6.  Total number of ways = (6 x 6) = 36. |
| 11. | In how many ways can a group of 5 men and 2 women be made out of a total of 7 men and 3 women? |
| |  |  |  |  | | --- | --- | --- | --- | | [A.](javascript:%20void%200;) | 63 | [B.](javascript:%20void%200;) | 90 | | [C.](javascript:%20void%200;) | 126 | [D.](javascript:%20void%200;) | 45 | | [E.](javascript:%20void%200;) | 135 |  |  |   [Answer & Explanation](javascript:%20void%200;)  Answer: Option A  Explanation:   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | Required number of ways = (7C5 x 3C2) = (7C2 x 3C1) = | http://www.indiabix.com/_files/images/aptitude/1-sym-oparen-h1.gif | 7 x 6 | x 3 | http://www.indiabix.com/_files/images/aptitude/1-sym-cparen-h1.gif | = 63. | | 2 x 1 |   [View Answer](javascript:%20void%200;) [Workspace](javascript:%20void%200;) [Report](javascript:%20void%200;) [Discuss in Forum](http://www.indiabix.com/aptitude/permutation-and-combination/discussion-681) |

|  |  |
| --- | --- |
| 12. | How many 4-letter words with or without meaning, can be formed out of the letters of the word, 'LOGARITHMS', if repetition of letters is not allowed? |
| |  |  |  |  | | --- | --- | --- | --- | | [A.](javascript:%20void%200;) | 40 | [B.](javascript:%20void%200;) | 400 | | [C.](javascript:%20void%200;) | 5040 | [D.](javascript:%20void%200;) | 2520 |   [Answer & Explanation](javascript:%20void%200;)  Answer: Option C  Explanation:  'LOGARITHMS' contains 10 different letters.   |  |  | | --- | --- | | Required number of words | = Number of arrangements of 10 letters, taking 4 at a time. | |  | = 10P4 | |  | = (10 x 9 x 8 x 7) | |  | = 5040. |   [View Answer](javascript:%20void%200;) [Workspace](javascript:%20void%200;) [Report](javascript:%20void%200;) [Discuss in Forum](http://www.indiabix.com/aptitude/permutation-and-combination/discussion-674) |

|  |  |
| --- | --- |
| 13. | In how many different ways can the letters of the word 'MATHEMATICS' be arranged so that the vowels always come together? |
| |  |  |  |  | | --- | --- | --- | --- | | [A.](javascript:%20void%200;) | 10080 | [B.](javascript:%20void%200;) | 4989600 | | [C.](javascript:%20void%200;) | 120960 | [D.](javascript:%20void%200;) | None of these |   [Answer & Explanation](javascript:%20void%200;)  Answer: Option C  Explanation:  In the word 'MATHEMATICS', we treat the vowels AEAI as one letter.  Thus, we have MTHMTCS (AEAI).  Now, we have to arrange 8 letters, out of which M occurs twice, T occurs twice and the rest are different.   |  |  |  | | --- | --- | --- | | http://www.indiabix.com/_files/images/aptitude/1-sym-tfr.gif Number of ways of arranging these letters = | 8! | = 10080. | | (2!)(2!) |   Now, AEAI has 4 letters in which A occurs 2 times and the rest are different.   |  |  |  | | --- | --- | --- | | Number of ways of arranging these letters = | 4! | = 12. | | 2! |   http://www.indiabix.com/_files/images/aptitude/1-sym-tfr.gif Required number of words = (10080 x 12) = 120960.  [View Answer](javascript:%20void%200;) [Workspace](javascript:%20void%200;) [Report](javascript:%20void%200;) [Discuss in Forum](http://www.indiabix.com/aptitude/permutation-and-combination/discussion-679) |

|  |  |
| --- | --- |
| 14. | In how many different ways can the letters of the word 'OPTICAL' be arranged so that the vowels always come together? |
| |  |  |  |  | | --- | --- | --- | --- | | [A.](javascript:%20void%200;) | 120 | [B.](javascript:%20void%200;) | 720 | | [C.](javascript:%20void%200;) | 4320 | [D.](javascript:%20void%200;) | 2160 | | [E.](javascript:%20void%200;) | None of these |  |  |   [Answer & Explanation](javascript:%20void%200;)  Answer: Option B  Explanation:  The word 'OPTICAL' contains 7 different letters.  When the vowels OIA are always together, they can be supposed to form one letter.  Then, we have to arrange the letters PTCL (OIA).  Now, 5 letters can be arranged in 5! = 120 ways.  The vowels (OIA) can be arranged among themselves in 3! = 6 ways.  http://www.indiabix.com/_files/images/aptitude/1-sym-tfr.gif Required number of ways = (120 x 6) = 720. |