Ravi Maths Tuition

Permutations and Combinations

11th Standard

Mathematics

Multiple Choice Question   50 x 1 = 50

1) Total number of words formed by 3 vowels and 5 consonants taken from 4 vowels and 7 consonants is equal to _____.

   (a) 75360   (b) 60480   (c) 54230   (d) none of these

2) The number of ways to arrange the letters of the word HAPPY are _____.

   (a) 120   (b) 90   (c) 40   (d) 60

3) The number of ways in which 8 men can be arranged in a row so that three particular men are seated consecutively is _____.

   (a) 6! × 3!   (b) 5!   (c) 9! × 3!   (d) none of these

4) The number of arrangements of the letters of the word BHARAT taking 3 at a time is _____.

   (a) 54   (b) 120   (c) 62   (d) 72

5) If $^{40}C_{r+2} = {}^{40}C_{r-2}$ then r is equal to _____.

   (a) 20   (b) 18   (c) 14   (d) 28

6) If $^{m}C_2 = {}^{n}C_1$ then _____.

   (a) m = 2n   (b) m(m-1) = 2n   (c) m = 2n(n+1)   (d) none of these

7) If $^{n}C_r + {}^{n}C_{r+1} = {}^{n+1}C_x$ then x is equal to _____.

   (a) r-2   (b) r-1   (c) n+1   (d) r+1

8) $^{6}C_1 + {}^{6}C_2 + {}^{6}C_3 + {}^{6}C_4 + {}^{6}C_5 + {}^{6}C_6$ is equal to _____.

   (a) 63   (b) 43   (c) 83   (d) none of these

9) If $C_0 + C_1 + C_2 + ... + C_n = 256$ then $^{2n}C_2$ is equal to _____.

   (a) 45   (b) 105   (c) 120   (d) 130

10) If $^{n+1}C_3 = 2.{}^{n}C_2$ then n is equal to _____.

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

11) Mohan has 3 pants and 2 shirts. The.number of different pairs of a pant and shirt he can wear are _____.

    (a) 5   (b) 6   (c) 7   (d) None of these

12) Sabnam has 2 school bags, 3 tiffin boxes and 2 water bottles. In how many ways can she carry these items (choosing one each)?

    (a) 11   (b) 12   (c) 13   (d) 14

13) A telegraph has 5 arms and each arm is capable of 4 distincts positions, including the position of rest. The total number of signals that can be made is _____.

    (a) 1024   (b) 1023   (c) 1022   (d) 1021

14) A sequence is a ternary sequence, if it contains digits 0, 1and 2. The total number of ternary sequences of length 9 which either begin with 210 or end with 210, is _____.

    (a) 1458   (b) 1431   (c) 729   (d) 707

15) The number of ways in which 3 prize can be distributed to 4 childrens, so that no child gets all the three prizes, are _____.

(a) 64   (b) 62   (c) 60   (d) None of these

16) Fill in the blanks.
I. When n = 6, r = 2, the value of $\frac{n!}{(n-r)!}$ is ...A....
II. When n = 9, r = 5, the value of $\frac{n!}{(n-r)!}$ ... B....
III. When n = 5, r = 2, the value of $\frac{n!}{(n-r)!}$ ... C...
IV. 3! + 4! = 7! is ...D....
Here, A, B, C and D refer to

(a) A→ 10, B→ 15120, C→ 10, D→ false   (b) A→ 30, B→ 15120, C→ 20, D→ true

(c) A→ 30, B→ 15120, C→ 10, D→ false   (d) None of the above

17) Match the following columns and choose the correct option from the codes given below.

Column I	Column II
A.5! equals	5040
B.7! equals	120
C.8! equals	4920
D.7! - 5! equals	40320
E.4! - 3! equals	18

(a)
A	B	C	D	E
1	2	3	4	5

(b)
A	B	C	D	E
2	1	3	4	5

(c)
A	B	C	D	E
2	1	4	3	5

(d)
A	B	C	D	E
5	4	3	2	1

18) If $\frac{1}{9!} + \frac{1}{10!} = \frac{x}{11!}$ then x is equal to _____.

(a) 100   (b) 110   (c) 99   (d) 121

19) The value of 1.1!+2·2!+ 3·3!+ .... +n·n! is _____.

(a) (n + 1)!   (b) (n + 1)!+ 1   (c) (n + 1}!-1   (d) n!+1

20) If (n + 1)! = 12 x (n - 1)! then the value of n is equal to

(a) 4   (b) 3   (c) 16   (d) 11

21) p(n -1, r) + r . P (n -1, r -1) equals _____.

(a) P(n-1,r+1)   (b) P(n,r-1)   (c) P(n, r)   (d) P(n + I, r + I)

22) The number of permutations of n different things taken r at a time, when repetition is allowed, is _____.

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

23) Consider the following statements
Statement I $^nP_r = \frac{n!}{(n-r)!}, 0 \le r \le n$
Statement II $^nP_r = n(n - 1)(n - 2)........(n - r + 1)$, $0 \le r \le n$
Which of the above statement (s) is/are true?

(a) Only I   (b) Only II   (c) Both I and II   (d) Neither I nor II

24) In a class of 10 students there are 3 girls A, B, C. The number of different ways they can be arranged in a row such that no two of three girls are consecutive are _____.

(a) 4! x 300   (b) 7! x 336   (c) 6! x 300   (d) 6! x 336

25) The total number of 9-digits numbers which have all different digits is _____.

(a) 10!   (b) 9!   (c) 9 x 9!   (d) 10 x 10!

26) The number of 5-digit telephone numbers having atleast one of their digits repeated is _____.

(a) 90000   (b) 10000   (c) 30240   (d) 69760

27) Fill in the blanks.

I. The number of permutations of n objects, where P objects are of the same kind and rest are all different equals ...A....

II. The number or permutations of n objects, where P_1 objects are of one kind, P_2 are of second kind, P_k are of kth kind and the rest, if any, are of different kind is ...B....

Here, A and B refer to

(a) $\frac{n!}{P!2!}, \frac{n!}{(P_1+P_2+\ldots+P_k)!}$ (b) $\frac{n!}{P!}, \frac{n!}{P_1!P_2!\ldots P_k!}$ (c) $\frac{P!}{n!}, \frac{(P_1+P_2\ldots+P_k)}{n!}$ (d) None of the above

28) The sum of all the numbers that can be formed with the digits 2, 3, 4, 5 taken all at a time, is _____.

(a) 93321   (b) 93322   (c) 93323   (d) 93324

29) The number of arrangements can be made with the letters of the word 'MATHEMATICS' in which all vowels are together, is _____.

(a) 120920   (b) 120930   (c) 120940   (d) 120960

30) How many number lying between 999 and 10000 can be formed with the help of the digits 0,2, 3, 6, 7, 8, when the digits are not be repeated?

(a) 100   (b) 200   (c) 300   (d) 400

31) The number of ways in which 2 black and 3 red balls can be selected from a bag containing 5 black and 6 red balls is _____.

(a) 170   (b) 190   (c) 180   (d) 200

32) The number of ways in which a mixed double game can be arranged from amongst 9 married couples, if no husband and wife play in the same game, is _____.

(a) 756   (b) 1512   (c) 3024   (d) None of these

33) In a polygon no three diagonals are concurrent. If the total number of points of intersection of diagonals interior to the polygon is 70, then the number of diagonals of polygon is _____.

(a) 8   (b) 20   (c) 28   (d) 32

34) Let T_n denote the number of triangles which can be formed using the vertices of a regular polygon of n sides. If $T_{n+1} - T_n = 21$, then n equals _____.

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

35) Eighteen guests have to be seated, half on each side of a long table. Four particular guests desire to sit on one particular side and three others on the other side. The number of ways in which the seating arrangement can be made, is _____.

(a) $\frac{11!}{6!5!} \times 9! \times 9!$ (b) $9! \times 9!$ (c) $\frac{11!}{6!5!} \times 5!6!$ (d) None of these

36) The number of ways a team of 2 players can be formed out of a group of 3 lawn tennis players X, Y, Z is _____.

(a) 7   (b) 6   (c) 3   (d) 4

37) If there are 5 different objects A, B, C,D, E. The number of combinations of 3 different objects is ...A....

Here, A refers to _____.

(a) 9   (b) 12   (c) 11   (d) 10

38) If $^nC_{12} = {}^nC_8$, then n is equal to _____.

(a) 20   (b) 12   (c) 6   (d) 30

39) If $n = {}^mC_2$, then the value of $^nC_2$ is _____.

(a) $^{m+1}C_4$ (b) $^{m-1}C_4$ (c) $^{m+2}C_4$ (d) $3 \times {}^{m+1}C_4$

40) $^{15}C_8 + {}^{15}C_9 - {}^{15}C_6 - {}^{15}C_7$ is equal to ....

(a) 0   (b) 2   (c) 1   (d) 3

41) Suppose you have a suitcase with a number lock. The number lock has 4 wheels each labelled with 10 digits from °to 9. The lock can be opened, if 4 specific digits.are arranged in a particular sequence with no repetition. Some how, you have forgotten this specific sequence of digits. You remember only the first digit which is 7. In order to open the lock, how many sequences of 3 digits you may have to check with?

(a) 720   (b) 504   (c) 500   (d) None of these

42) The sum of the digits in unit place of all the numbers formed with the help of 3, 4, 5 and 6 taken all at a time is _____.

(a) 432   (b) 108   (c) 36   (d) 18

43) Match the following columns and choose the correct option from the codes given below.

Column I	Column II
A. $\frac{7!}{5!}$ equals	28
B. $\frac{12!}{(10!)(2!)}$ equals	42
C. $\frac{8!}{6! \times 2!}$ equals	66

(a)   (b)   (c)   (d)

A	B	C		A	B	C		A	B	C		A	B	C
1	2	3		1	3	2		3	2	1		2	3	1

44) Consider the following statements
Statement I If $5\,^4P_r = 6\,^5P_{r-1}$,then r = 8,3
Statement II If $^5P_r = {}^6p_{r-1}$ ' then r = 5
Which of the above statements (s) is/are true?

(a) Only I   (b) Only II   (c) Both I and II   (d) Neither I nor II

45) Identify the correct combination of true (T) and false (F) of the given two statements.
Statement I The number of permutations of letters of word 'ROOT' are 12.
Statement II The number of permutation of letters of word 'INSTITUTE' are $\frac{9!}{2!3!}$

(a) FT   (b) TF   (c) FF   (d) TT

46) The number of natural numbers smaller than 10^4, in the decimal notation of which all the digits are distinct is _____.

(a) 5274   (b) 5275   (c) 5276   (d) 5277

47) The number of ways in which three girls and nine boys can be seated in two vans, each having numbered seats 3 in the front and 4 at the back, such that 3 girls are always sit together in a back row on adjacent seats, is _____.

(a) $^H P_9 \times 4! \times 3$ (b) $^{11}P_9 \times 4 \times 3!$ (c) $^{14}P_{12} \times 4! \times 3$ (d) $^{14}P_{12} \times 4 \times 3!$

48) The number of combinations of 4 different objects A, B, C,D taken 2 at a time is _____.

(a) 4   (b) 6   (c) 7   (d) 8

49) Person wishes to make up as many different parties as he can out of his 20 friends such that each party consists of the same number of persons. The number of friends he should invite are ...A.... Here, A refers to _____.

(a) 8   (b) 9   (c) 10   (d) None of these

50) A five digit number divisible by 3 is to be formed using the numbers 0, 1, 2, 3, 4 and 5, without repetition. The total number of ways this can be done, is _____.

(a) 216   (b) 240   (c) 600   (d) 3125

2 Marks   281 x 2 = 562

51) How many 2 digit even numbers can be formed from the digits 1, 2, 3, 4, 5 if the digits can be repeated?

52) How many words, with or without meaning, can be formed using all the letters of the word EQUATION at a time so that the vowels and consonants occur together?

53) From a class of 25 students, 10 are to be chosen for an excursion party. There are 3 students who decide that either all of them will join or none of them will join. In how many ways can the excursion party be chosen ?

54) It is required to seat 5 men and 4 women in a row so that the women occupy the even places. How many such arrangements are possible ?

55) Find the number of different signals that can be generated by arranging at least 2 flags in order (one below the other) on a vertical staff, if five different flags are available.

56) How many 3-digit even numbers can be made using the digits 1, 2, 3, 4, 6, 7, if no digit is repeated?

57) In how many ways can 5 girls and 3 boys be seated in a row so that no two boys are together?

58) How many 4-digit numbers are there with no digit repeated?

59) Find the number of ways of selecting 9 balls from 6 red balls, 5 white balls and 5 blue balls if each selection consists of 3 balls of each colour.

60) The English alphabet has 5 vowels and 21 consonants. How many words with two different vowels and 2 different consonants can be formed from the alphabet ?

61) In an examination, a question paper consists of 12 questions divided into two parts i.e., Part I and Part II, containing 5 and 7 questions, respectively. A student is required to attempt 8 questions in all, selecting at least 3 from each part. In how many ways can a student select the questions ?

62) Determine the number of 5-card combinations out of a deck of 52 cards if each selection of 5 cards has exactly one king.

63) From a committee of 8 persons, in how many ways can we choose a chairman and a vice-chairman assuming one person can not hold more than one postion?

64) Determine the number of 5 card combinations out of a deck of 52 cards if there is exactly one ace in each combination.

65) How many words, with or without meaning can be made from the letters of the word MONDAY, assuming that no letter is repeated, if.
(i) 4 letters are used at a time,
(ii) all letters are used at a time,
(iii) all letters are used but first letter is a vowel?

66) If $^nC_9 = {}^nC_8$, find $^nC_{17}$.

67) A committee of 7 has to be formed from 9 boys and 4 girls. In how many ways can this be done when the committee consists of:
(i) exactly 3 girls ? (ii) atleast 3 girls ? (iii) atmost 3 girls ?

68) How many words, with or without meaning can be formed using all the letters of the word EQUATION, using each letter exactly once?

69) Evaluate: (i) 8 ! (ii) 4 ! – 3 !

70) Is 3! + 4! = 7! ?

71) How many 3-digit numbers can be formed by using the digits 1 to 9 if no digit is repeated?

72) If $^nC_8 = {}^nC_2$ find $^nC_2$.

73) How many chords can be drawn through 21 points on a circle?

74) In how many ways can a team of 3 boys and 3 girls be selected from 5 boys and 4 girls?

75) Compute $\frac{8!}{6! \times 2!}$

76) If $\frac{1}{6!} + \frac{1}{7!} = \frac{x}{8!}$, find x

77) Evaluate $\frac{n!}{(n-r)!}$ when (i) n = 6, r = 2 (ii) n=9, r=5

78) In how many ways can the letters of the word ASSASSINATION be arranged so that all the S's are together ?

79) A bag contains 5 black and 6 red balls. Determine the number of ways in which 2 black and 3 red balls can be selected.

80) In how many ways can a student choose a programme of 5 courses if 9 courses are available and 2 specific courses are compulsory for every student?

81) A group consists of 4 girls and 7 boys. In how many ways can a team of 5 members be selected if the team has (i) no girl ? (ii) at least one boy and one girl ? (iii) at least 3 girls ?

82) How many words, with or without meaning, each of 2 vowels and 3 consonants can be formed from the letters of the word DAUGHTER?

83) If the different permutations of all the letter of the word EXAMINATION are listed as in a dictionary, how many words are there in this list before the first word starting with E?

84) How many 6-digit numbers can be formed from the digits 0, 1, 3, 5, 7 and 9 which are divisible by 10 and no digit is repeated ?

85) Find the number of 4 letter words, with or without meaning, which can be formed out of the letters of the word ROSE, where the repetition of the letters is not allowed.

86) Given 4 flags of different colours, how many different signals can be generated, if a signal requires the use of 2 flags one below the other?

87) Evaluate (i) 5 ! (ii) 7 ! (iii) 7 ! − 5!

88) Compute $(i)\frac{7!}{5!}$
$(ii)\frac{12!}{(10!)(2!)}$

89) Evaluate $\frac{n!}{r!(n-r)!}$ when n = 5, r = 2.

90) If $\frac{1}{8!} + \frac{1}{9!} = \frac{x}{10!}$ find x.

91) Find the number of permutations of the letters of the word ALLAHABAD.

92) How many 4-digit numbers can be formed by using the digits 1 to 9 if repetition of digits is not allowed?

93) Find n if $^{n-1}P_3 : {^nP_4} = 1 : 9$

94) Find r if $(i)^5P_r = 2\,^6P_{r-1}$
$(ii)^5P_r = {^6P_{r-1}}$

95) The number of permutations of n objects, where p objects are of the same kind and rest are all different = n!/p!.

96) The number of permutations of n objects, where p_1 objects are of one kind, p_2 are of second kind, ..., p_k are of kth kind and the rest, if any, are of different kind is

97) In a monthly test, the teacher decides that there will be three questions, one from each of the Exercise 7, 8 and 9 of textbook. If there are 11 questions in Exercise 7, 15 in Exercise 8 and 10 in Exercise 9, in how many ways can three questions be selected ?

98) A gentleman has 6 friends to invite, In how many ways can he send invitation cards to them, if he has threee servants to carry the cards?

99) Given 5 flags of different colours. How many different signals can be generated, if each signal requires the use of 2 flags, one below the other?

100) A room has 7 doors. In how many ways can a man enter the room through one door and come out through a different door ?

101) How may numbers are there between 100 and 1000 in which all the digits are distinct?

102) In how many ways can 6 letters be posted in 5 letter boxes ?

103) Find the number of different words can be formed from the letters of the word "TRIANGLE", so that
(i) all vowels occur together.
(ii) all vowels do not occur together.

104) How many 4-digit numbers are there, when a digit may be repeated any number of times?

105) In an examination, there are three multiple choice questions and each question has 4 choices. Find the number of ways in which a student can fail to get all answer correct.

106) How many 3 digit numbers more than 600 can be formed by using the digit 2, 3, 4, 6 and 7.

107) Evaluate the following: $^{14}C_3$

108) In how many ways can 5 children be arranged in a line such that
(i) two particular children of them are always together?
(ii) two particular children of them are never together?

109) The flag of a newly formed forum is in the form of three blocks □□□ , each to be coloured differently. If there are six different colours on the whole to choose from, how many such designs are possible ?

110) If ^nP_r = 840 and ^nC_r = 35, find r.

111) Evaluate the following: $^{100}C_{99}$

112) Evaluate the following: $^{35}C_{35}$

113) Evaluate the following: $^{35}C_0$

114) In a certain city, all telephone numbers have six digits, the first two digits always being 41 or 42 or 46 or 62 or 64. How many telephone numbers have all six digits distinct ?

115) In how many ways, can 5 sportsmen be selected a group of 10?

116) A code word is to consist of two distinct English alphabets followed by two distinct numbers between 1 and 9. e.g. CA23 is code word.
(i) How many such code words are there ?
(ii) How many of them end with an even integer ?

117) In how many ways, can 8 Indians, 4 Americans and 4 Englishmen be seated in a row so that all persons of the same nationally sit together?

118) Compute $\frac{8!}{4!}$. is $\frac{8!}{4!}$ = 2!?

119) It there are 15 persons in a party anf if each two of them shake hands wuth each other.How many hand-sakes happen in the party?

120) Everybody in a room shakes hands with everybody else. The total number of Hand-shakes is 66. Find the total number of persons in the room.

121) In how many ways, can a criket team of 11 players be selected out of 16 players,
(i) if two particular players are always be included?
(ii) if two particular players are always be ecculded?

122) In how many ways can 3 prizes be distributed among 4 boys, when
(i)   no boy gets more than one prize ?
(ii)   a boy may get any number of prizes ?
(iii) no boy gets all the prizes ?

123) Evaluate $\frac{n!}{(n-r)!}$ when r = 3.

124) If the ratio $^{2n}C_3 :^n C_3$ is equal to 11 : 1, find the value of n.

125) In how many ways, two books of different languages can be selected from 10 Hindi, 5 English and 7 Sanskrit books ?

126) All the letters of the word ' EAMCOT ' are arranged in different possible ways. Find the number of such arrangements in which no two vowels are adjacent to each other.

127) We wish to select 6 person from 3 but idf the person A is Chosen. In how many ways, can the selection be made?

128) Convert product into factorials.
(i) $6 \cdot 7 \cdot 8 \cdot 9 \cdot 10$
(ii) $2 \cdot 4 \cdot 6 \cdot 8 \cdot 10$

129) Compute $\frac{(12!)-(10!)}{9!}$.

130) Find the LCM of $6!, 7!$ and $8!$.

131) The letters of the word 'TUESDAY' are arranged in a line, each arrangement ending with the letter S. How many different arrangements are possible?How many of them start with letter D?

132) How many numbers are there between 100 and 1000 which have exactly one of their digits as 7 ?

133) If $\frac{1}{7!} + \frac{1}{9!} = \frac{x}{10!}$, then find x.

134) Pratiksha wants to go abroad by ship and to return by aitline. She has a choice of 6 different ships to go and 4 airlines to return. In how many ways can she perform her journey ?

135) How many AP's with 10 terms are there whose first terms is in the set {1, 2, 3) and whose common difference is in the set {1, 2, 3, 4, 5} ?

136) How many words (with or without meaning) of three distinct leters of the English alphabets are there ?

137) If $^{n+2}C_8$: $^{n-2}P_4$ = 57:16, then find the value of n.

138) In how many ways can the letters of the word 'GOLDEN' be arranged so that N and E are always together.

139) If $(n+3)! = 56 \times (n+1)!$, then find n.

140) In how many ways can the letters of the word 'PENCIL" be arranged so that N is always next to E?

141) Find the number of different words that can be formed with the letters of the word ENGLISH so that the word begin with E and end with I?

142) In how many ways 3 Mathematics books, 4 History books, 3 Chemistry books and 2 Biology books can be arranged on a shelf so that all books of the same subjects are together?

143) Prov that $\frac{(2n)!}{n!} = \{1 \cdot 2 \cdot 3 \cdot 4 \cdot 5 \ldots (2n-1)\}2^n$.

144) Find the number of different words that can be formed from the letters of the word 'TRIANGLE' so that no vowels are together.

145) Prove that $r.^n C_r = n.^{n-1}C_{r-1}$.

146) Find the number of ways in which the letters of the word 'MACHINE' can be arranged so that the vowels occupy the odd places.

147) How many words can be formed out of the letters of the word 'ORIENTAL' so that the vowels occupy the odd places?

148) Prove that 33! is dicisble by 2^{15}. What is the largest integer n such that 33! is divisible by 2^n?

149) How many different words can be formed with the letters of the word SUNDAY? How many of these begin with N? How many begin N and end in Y?

150) In how many ways can the letters of the word 'MATHEMATICS' be arranged so that vowels are always together?

151) In how many ways can 7 plus (+) signs and 5 minus (-) signs be arranged in a row so that no two minus signs are together?

152) In how many ways , can a the of 3 boys and 3 girls be selected from 5 boys and 4 girls ?

153) In the examination , Yamini has to select 4 question from each part. There are 6, 7 and 8 questions in part I, Part II and Part III, respectively. What is the number of possible combination in which she can choose the questions?

154) There are 10 professors and 20 students out of whom a committee of 2 professors and 3 students is to be formed, Find the number of ways which this can be done. further find in how many of these committee
(I) A particular professors is included ?
(II) A particular Student is included ?
(III) A particular Student is excluded ?

155) If $\frac{n!}{2!(n-2)!}$ and $\frac{n!}{4!(n-4)!}$ are in the ratio 2:1, then find the value of n.

156) Evaluate the following
4! - 3!

157) Evaluate the following.
$2 \times 6! - 3 \times 5!$

158) Compute $\frac{20!}{18!(20-18)!}$

159) A bag contains six white marbels and five red marbles. Find the number of ways in which four marbels can be drrawn from the bag, If
(i) They can be of any colour
(ii) two must be white and two must be red
(iii) they must all be of the same colour

160) If $\frac{1}{8!} + \frac{1}{9!} = \frac{x}{10!}$ then find x.

161) If $^{n-1}C_r : ^nC_r : ^{n+1}C_r$ = 6:9:13, then find the values of n and r

162) Prove that $n(n-1)(n-2)\ldots(n-r+1) = \frac{n!}{(n-r)!}$.

163) Covert the following products into factorials, (n+1)(n+2)(n+3)...(2n).

164) A man has 7 friends . In how many ways can he one or more them to party?

165) How many chords can be drawn through 21 points on a circle?

166) Prove that $(n!).(n+2) = [n! + (n+1)!]$

167) Convert product into factorials. $2 \cdot 4 \cdot 6 \cdot 8 \cdot 10$

168) If a ploygon has 44 diagonals, then find the number of sides

169) Find n, if (n=2)!=2550x n!.

170) Prove that $\frac{n!}{(n-r)!r!} + \frac{n!}{(n-r+1)!(r-1)!} = \frac{(n+1)!}{r!(n-r+1)}$

171) Find the number of ways in which 5 boys and 5 girls be seated in a row, so that no two girls sit together.

172) Find the values of the following. $^6P_4$

173) Find the values of the following. P(15,2)

174) If 20 lines are drawn in a plane such that no two of them are parallel and no three are concurrent, in how many points will they interesect each other?

175) Find the number of parallelograms that can be formed from a set of four parallel lines intersecting another set of three parallel lines

176) Out of 18 points in a plane, no three are in the same line except five points which are collinear find the number of lines that can be formed by joining these points in pairs.

177) Find the number of triangles that are formed by choosing the vertices from a set of 12 points, Seven of which lie on the same line.

178) Find the number of ways in which 5 boys and 5 girls be seated in a row, so that boys and girls sit alternatively.

179) If P(n,5) == 20P(n,3), find n.

180) Evaluate $^{13}C_6 + {}^{13}C_5$

181) How many numbers between 400 and 1000 can be made with the digits 2, 3, 4, 5, 6 and 0, when repetition of digits is not allowed?

182) Evaluate $\sum_{r=1}^{5} {}^5C_r$

183) Find the value of r, if $^5P_r = 2 \times {}^6P_{r-1}$.

184) How many words with or with out meanig each of 2 Vowels and 3 Consonants can be formed from the letters of the word 'DAUGHTER' ?

185) a sports team of 11 student is to be constituted , choosing atleast 5 from class XI and atleast 5 from class XII . If there are 20 student in each of these clases , then how many wyas can the team be constituted?

186) If $^nC_{10} = nC_{12}$, then find the value of $^{23}C_n$.

187) Determine the number of natural numbers smaller than,10^4 in the decimal notation of which all the digits are distinct.

188) If P(9,r) =3024, find r.

189) If $^{16}C_r = {}^{16}C_{r+2}$, find $^rC_4$

190) If $^9P_5 + 5.{}^9P_4 = {}^{10}P_r$, find r.

191) If $^8C_r - {}^7C_3 = {}^7C_2$, Find r

192) If P(2n-1,n) : P(2n+1,n-1)=22:7, find n.

193) Prove that P(n,)=P(n-1,r)+r.P(n-1,r-1).

194) Evaluate $^nC_r + 2.{}^nC_{r-1} + {}^nC_{r-2}$

195) In how many ways two different rings can be worn in four fingers with atmost one in

196) How many different 4-digit numbers can be formed from the digits 2, 3, 4 and 6, if each digit is used only once in a number? Further, how many of these numbers
(i) end at 4?

197) How many different 4-digit numbers can be formed from the digits 2, 3, 4 and 6, if each digit is used only once in a number? Further, how many of these numbers
(ii) end at 3?

198) How many different 4-digit numbers can be formed from the digits 2, 3, 4 and 6, if each digit is used only once in a number? Further, how many of these numbers
(iii) end at 3 or 4?

199) In how many ways can 6 persons occupy 4 vacants seats?

200) A committee of two personds is to be constituted from a group of 2 men and 3 women . In how ,many ways can this be done?

201) In a foot ball championship, 153 matches were played. Every two team played one match with each other. Find the number of teams, participating in the campionship

202) Find the number of ways in which a team of eleven players can be selected from 22 players, if two particular player are always including anf four are always excluding

203) A question paper has two parts part A and B each containing 1 qusetion . If the student has to choose 8 from part a and 5 from part B. In how many ways can he choose the questions?

204) How many 3-digit numbers can be formed by using the digits 1 to 9, if no digit is repeated?

205) Find the value of the Expression $^{47}C_4 + \sum_{j=1}^{5} {}^{52-j}C_3$

206) Evaluate the following. $^{10}C_8$

207) Out of 6 gentleman and 4 ladies a committee od 5 is to be formed . In how many wys can this be done so as to include atleast on elady in each committee?

208) If m parallel lines in plane are intersected by a family of n parallel lines, then find the number of parallelograms formed.

209) A polygon has 65 diagonals, the find the number of its sides

210) Find the number of triangles thet are formed by choosing the vertices from a set of 10 points 6 of which lie on the same line

211) Evaluate the following. $^{50}C_{50}$

212) If ^nP_r = 720 and ^nC_r = 120 , find r

213) In how many different ways, the letters of the word 'ALGEBRA' can be arranged in a row, if the two A's are together?

214) In how many different ways, the letters of the word 'ALGEBRA' can be arranged in a row, if the two A's are not together?

215) If $^{24}C_x = {}^{24}C_{2x+3}$, find x.

216) Evaluate $^{10}C_4 + {}^{10}C_5$

217) How many words, wth or without meaning can be made from the letters of the word 'MONDAY',assuming that no letter is repeated, if all letters are usedz at a time ?

218) If $\alpha = {}^mC_2$, then find the value of $^\alpha C_2$

219) How many different signals can be made by using any nnumber flags from 6 flags of different colours?

220) Find the number of different words that can be formed from the letters of the word 'INTERMEDIATE' such that two vowels never come together

221) Evaluate $^{31}C_{26} - {}^{30}C_{26}$

222) Evaluate $^{15}C_8 + {}^{15}C_9 - {}^{15}C_6 - {}^{15}C_7$

223) How many different words can be formed by using all the letters of word 'ALLAHABAD'? In how many of them, vowels occupy the even position?

224) Three men have 4 coats, 5 waustcoats and 6 caps. In how many ways, can they wear them?

225) In how many ways, 3 prizes can be given o 7 boys when each boy is eligible for any of the prizes?

226) How many 4-digit numbers can be formed with the digits 1, 2, 3, 4, 5, 6 when a digit may be repeated any number of times in any arrangement?

227) How many numbers can be formed with the digits 1, 2, 3, 4, 3, 2 and 1, so that odd digits always occupy the odd places?

228) Find the number of 5-digit telephone numbers having atleast one of their digits repeated.

229) How many permutations of the letters,two of the words 'INDIA' are there?

230) Verify that $2 \times {}^7C_4 = {}^8C_4$

231) Prove that $^nC_r \times {}^rC_5 = {}^nC_s \times {}^{n-s}C_{r-s}$

232) Find the number of permutations of the letters of the word 'INDEPENDENCE'.

233) In how many ways, 5 flags in which 3 are red, 1 is white and 1 is blue, be arranged on a staff, one below the other, if flags of one colour are not distinguishable?

234) If $^nP_4$=360, find the value of n.

235) Prove that following.
$^nP_n=2.^nP_{n-2}$

236) Prove that following
$^nP_n=^nP_{n-1}$

237) Prove that following.
$^nP_r=n.^{n-1}P_{r-1}$

238) How many 3-digit numbers are there with distinct digits with each digit odd?

239) Find the number of 4-digit numbers that can be formed with the digits 2, 3, 4, 7 and using each digit only once.

240) Find the number of different 4-letter words, with or without meaning that can be formed from the letters of the word 'NUMBER'.

241) How many different signals can be made by 5 flags from 8 flags of different colours?

242) Sunil wants to arrange 3 Economics, 2 History and 4 Language books on a shelf. If the books of the same subject are different.Determine the number of all possible arrangements

243) Eight students are contesting the election for the presidentship of the student's union. In how many ways can their names be listed on the ballot papers?

244) A committee of 10 is to be formed form 8 gentleman and 9 ladies . In how many Wyas this can be done if atleat five ladies have to be included in a comittee? In how many of these committees
(i)the ladies are in majority?
(ii)the gentlement are in majority?

245) Students are asked to make National flag 'TYRANGA' on Independence day. As we know flag has three colours, in how many ways flag can be made with these three colours and waht are the significance of three colors of our National flag?

246) A team of four students is to be send for a competition,. 12 students ,offerd their service for the same .But from past experience , it was observed that 5 students who had offered the service were not truth to their Work and they did mischif one time or the other are not to be selected for a competition and which value system these 5 students need to acquire ?

247) In how many ways, can the letters of the word 'HONESTY' be arranged? Do you like jumbled letters of word HONESTY? why honesty is acquired in your life?

248) In a cricet board, Anil jain is a cricket team selector, he can select a cricket team, 11 from 17 palyers in which only 5 players can bowl . In how many ways exaclty 4 bowlers must include out of 11 players and what do you understand by the 'team spirit?

249) Find the number of arrangement of the letters of the word 'REPUBLIC' How many arrangements stratwith a vowel ? Do you remember Republic day? what is its significance?

250) Find n, if (n+1)!=12 X (n-1)!

251) If $^{15}C_r$: $^{15}C_{r-1}$=11:5 Find r

252) there are 6 multiple choice questions in an examination. how many ssequences of answers are possible , if the first three quesstion have 4 Choices each and remaning three have 3 each?

253) In how many ways, Can 50 voters vote for the 4 Candidates contesting the election for the post of secretary of their association?

254) How many number are there between 100 and 1000 such that every digit is either 2 or 9 ?

255) A room has 8 doors. In how many ways can a man enter the room through one door and come out through a different door?

256) How many three-digit numbers can be formed without using the digits 0, 2, 4, 6, and 8?

257) How many numbers are there between 100 and 1000 such that 5 is in the unit place?

258) How many three digit numbers are there without repetition?

259) Evaluate $\frac{10!}{6!4!}$

260) Find x, if $\frac{1}{7!} + \frac{1}{8!} = \frac{x}{9!}$

261) Evaluate: 4! - 3!

262) Three men have 3 trousers, 4 shirts and 5 caps. In how many ways can they wear them?

263) From among the 30 teachers in a school, one principal and one vice-principal are to be to appointed. In how many ways can this be done?

264) If $^nC_8 = {}^nC_6$, find $^nC_2$

265) For the post of 6 teachers, there are 23 applicants 2 posts are reserved for exservicemen candidates and there are 8 ex-servicemen candidates among the applicants. In how many ways can the selection be made?

266) A man wants to select a shirt and trousers from a showroom. If there are 20 shirts and 50 trousers in variety, in how many ways can he choose one shirt and one trousers?

267) How many words with or without meaning of three distinct letters of the English alphabets are there?

268) A class has 20 students. Prizes for standing first, second and third in physics are to be awarded. In how many ways can this be done?

269) How many numbers between 2000 and 3000 can be formed from the digits 2,3,4,5,6 and 7, if repetition of digit is not allowed?

270) How many three digit odd numbers can be formed by using the digits 1,2,3,4,5 and 6 if (i) the repetition of digits is not allowed. (ii) the repetition of digits is allowed.

271) In how many ways can 5 letters be posted in 4 letter boxes?

272) A team consists of 6 boys and 4 girls and other has 3 boys and 8 girls. How many single matches can be arranged between the two teams when a boy plays against a boy and a girl plays against a girl?

273) If $\frac{n!}{3!(n-4)!}$ and $\frac{n!}{5!(n-5)!}$ are in the ratio 5:3 find the value of n.

274) Evaluate: $\frac{15!}{9!5!}$

275) Evaluate:
$\frac{1}{6!} + \frac{1}{7!} + \frac{1}{8!}$

276) Evaluate $\frac{n!}{r!(n-r)!}$ when n=7,r=0

277) Evaluate $\frac{n!}{r!(n-r)!}$ when n=6, r=2

278) If $\frac{(n-1)!}{(n-4)!} : \frac{n!}{(n-4)!} = 1:9$, find the value of n

279) Evaluate: $\frac{15!}{9!5!}$

280) Evaluate: $\frac{1}{6!} + \frac{1}{7!} + \frac{1}{8!}$

281) Evaluate $\frac{n!}{r!(n-r)!}$ when i) n=7, r=0

282) $\frac{n!}{r!(n-r)!}$ when n=6, r=2

283) If $\frac{(n-1)!}{n-4)!} : \frac{n!}{(n-4)!} = 1 : 9$ find the value of n

284) Find the number of 4 letter words, with or without meaning which can be formed out of the letters of the word NOSE, when
(i) the repetition of the letters is not allowed
(ii) the repetition of the letters is allowed.

285) How many three-letter words can be formed using a, b, c, d, e if
(i) repetition is not allowed
(ii) repetition is allowed

286) If P(n, 5) : P(n, 3) = 2:1, find n.

287) A code word is to consist of three distinct English alphabets followed by three distinct numbers from 1 to 9. For example DPO 517 is a code word. Ho many such code words are there?

288) Find the total number of permutations of the letters of the word 'INSTITUTE'.

289) If $^nC_{r-1}$=36, ^nC_r = 84 and $^nC_{r+1}$ = 126 then find $^rC_2$

290) If $^nC_5$ and $^nC_4$ are in A.P. then find n.

291) In an examination, a student has to answer 4 questions out of 5 questions, questions 1 and 2 are compulsory. Determine the number of ways in which the student can make the choice.

292) Find r if $^{54}P_{r+3} : {}^{54}P_{r+3}$ = 30800 : 1

293) Find n if $^{2n+1}P_{n+1} : {}^{2n-1}Pn$ = 3 : 5

294) How many words with or without meaning can be formed by using the letters of the word TRIANGLE?

295) How many 6-digit telephone numbers can be constructed with digits 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 if each number starts with 35 and no digit appears more than once?

296) In how many ways can 9 examination papers be arranged so that the best and the worst papers are never together?

297) A party is arranged for 14 persons along two sides of a table with 7 chairs on each side. Four persons wish to sit on one particular side and they two on the other side. In how many ways can be seated?

298) How many words can be formed by using the letters of the word ORIENTAL so that A and E always occupy the odd places?

299) There are 8 students appearing for an examination of which 3 appear in chemistry paper and 5 in other different subjects. In how many ways can they be seated if
(i) all the students appearing for chemistry are together?
(ii) all the students appearing for chemistry are not together?

300) Find the number of different permutations of the letters of the word BANANA?

301) How many permutations can be made with the letters of the word MATHEMATICS? In how many of them vowels are together?

302) A bag contains 6 red balls and 8 green balls. Determine the number of ways in which 4 red balls and 5 green balls can be selected.

303) Prove the inequaliy. $(n!)^2 \leq n^n.n! < (2n)!$ for all positive integers.

304) If $^nC_4 = {}^nC_6$, find $^{12}C_n$

305) If $^{2n}C_3 : {}^nC_2$ = 44 : 3, find n

306) If $^{16}C_r = {}^{16}C_{r+2}$, find $^rC_4$.

307) A box contains 5 red balls and 6 black balls. In how many ways can 6 balls be selected so that there are at least two balls of each colour?

308) A boy has 3 library cards and he has 8 books of interest in the library. Of these 8 books he does not want to borrow chemistry part II, unless chemistry part I is also borrowed. In how many ways can be choose the three books to be borrowed?

309) There are 10 points in a plane of which 4 are collinear. How many different straight lines can be drawn by joining these points.

310) A gentleman has 5 friends to invite. In how many ways can he send invitation cards to them, if he has three servants to carry the cards?

311) In how many ways 9 pictures can be hung from 6 pictures nail on a wall?

312) If $^nP_r = {^nP_{r+1}}$ and $^nC_r = {^nC_{r-1}}$, find the values of n and r.

313) In how many ways can this diagram be coloured subject to the following two conditions.
(i) Each of the smaller triangle is to be painted with one of three colours: red, black, green.
(ii) No two adjacent regions have the same colour.

314) Evaluate (i) $^{75}P_2$
(ii) $^8P_8$

315) If $^nP_4 : {^nP_5} = 1:2$, find n.

316) If $^{10}P_r = 5040$, find the value of r.

317) Find the value of n such that P(n, 5) = 42 P(n, 3) , n > 4.

318) Find r, if $5 \cdot {^4P_r} = 6 \cdot {^5P_{r-1}}$.

319) If $^{n-1}P_3 : {^{n+1}P_3} = 5 : 12$, find n.

320) If $^{2n+1}P_{n-1} : {^{2n-1}P_n} = 3 : 5$, find n.

321) In how many ways can 18 people line up at a ticket window of a cinema hall?

322) From a committee of 12 persons, in how many ways can we choose a chairman and a vice-chairman assuming one person can not hold more than one position?

323) From a class of 32 students, 4 are to be chosen for a competition. In how many ways can this be done?

324) If there are 10 persons in a party and each two of them shake hands with each other, how many hand-shakes happen in the party?

325) Find the number of chords that can be drawn through 16 points on a circle.

326) Prove that $\frac{1}{9!} + \frac{1}{10!} + \frac{1}{11!} = \frac{122}{11!}$

327) If $\frac{1}{9!} + \frac{1}{10!} = \frac{x}{11!}$, then find the value of x.

328) Evaluate the following.
$^5P_2$

329) If P(n, 4) = 12·P(n, 2), find n.

330) If $^nC_{12} = {^nC_5}$, find the value of n.

331) If $^nC_8 = {^nC_6}$, then find $^nC_2$.

3 Marks   74 x 3 = 222

332) How many numbers lying between 100 and 1000 can be formed with the digits 0, 1, 2, 3, 4, 5, if the repetition of the digits is not allowed?

333) In how many of the distinct permutations of the letters in 'MISSISSIPPI' do the four I's not come together?

334) Determine n, if (i) $^{2n}C_3 : {}^nC_3$ = 12:1, (ii) $^{2n}C_3 : {}^nC_3$ =11:1

335) How many 3-digit numbers can be formed from the digits 1, 2, 3, 4 and 5 assuming that
(i) repetition of the digits is allowed?
(ii) repetition of the digits is not allowed?

336) How many 3-digit even numbers can be formed from the digits 1, 2, 3, 4, 5, 6 if the digits can be repeated?

337) How many 4-letter code can be formed using the first 10 letters of the English alphabet, if no letter can be repeated?

338) How many 5-digit telephone numbers can be constructed using the digits 0 to 9 if each number starts with 67 and no digit appears more than once?

339) A coin is tossed 3 times and the outcomes are recorded. How many possible outcomes are there?

340) Given 5 flags of different colours, how many different signals can be generated if each signal requires the use of 2 flags, one below the other?

341) In how many ways can one select a cricket team of eleven from 17 players in which only 5 players can bowl if each cricket team of 11 must include exactly 4 bowlers?

342) A committee of 3 persons is to be constituted from a group of 2 men and 3 women. In how many ways can this be done? How many of these committees would consist of 1 man and 2 women?

343) Find the number of words with or without meaning which can be made using all the letters of the word AGAIN. If these words are written as in a dictionary, There are 5 letters in the word AGAIN, in which A appears 2 times. Therefore, the required number of wordswhat will be the 50th word?

344) How many numbers greater than 1000000 can be formed by using the digits 1, 2, 0, 2, 4, 2, 4?

345) How many words, with or without meaning, each of 3 vowels and 2 consonants can be formed from the letters of the word INVOLUTE ?

346) The number of permutations of n different objects taken r at a time, where 0 < r ≤ n and the objects do not repeat is n (n − 1) (n − 2). . .(n − r + 1), which is denoted by ^nP_r .

347) $^nP_r = {}^nC_r, r!, 0 < r \leq n.$

348) $^nC_r + {}^nC_{r-1} = {}^{n+1}C_r$

349) Five persons entered in the lift cabin on the ground floor of an 8-floor house. Suppose each of them can leave the cabinindependently at any floor begining with the first. Find the total number of ways in which each of the five persons can leave the cabin
(i) at anyone of the 7 floor.
(ii) at different floors.

350) How many natural numbers less than 1000 can be formed with the digits 1, 2, 3, 4, and 5, if repetition of digits is allowed?

351) Therre are 2 candidates for Classical language, 5 for Mathematics and 4 for Natural Science scholarship.
(i) In how many ways can these scholarship be awarded?
(ii) In how many ways, one of these scholarship be awarded?

352) How many numbers greater than 1000, but not greater than 4000 can be formed with the digits 0, 1, 2, 3, 4, if
(i) repetition of digits is alllowed?
(ii) repetition of digits is not allowed?

353) Find the number of different 8 letters of the word 'DAUGHTER' so that
(i) all vowels occur together.

354) In how many ways can 10 examination papers be arranged so that the best and the worst papers are never together?

355) How many different words can be formed with the letters of the word 'HARYANA'? How many of these have H and N together?

356) Three married couples are to be seated in a row having six seats in cinema halls. If spouses are to be seated next to each other, in how many ways can they be seated? Also, find the number of ways of their seating, if all the ladies sit together.

357) Prove that 35! is divisble by 2^{12}. What is the largest integer n such that 35! is divisible by 2^n?

358) If $\frac{(2n)!}{3!(2n-3)!}$ and $\frac{n!}{2!(n-2)!}$ are in the ration 44:3, find n

359) Find the number of different 8 letters of the word 'DAUGHTER' so that all vowels do not occur together.

360) How many different words can be formed with the letters of the word 'HARYANA'? How many of these begin with H and end with N?

361) How many different words can be formed with the letters of the word 'HARYANA'? How many of these have three vowels together?

362) A boy has 3 library tickets and 8 books of his interet in the library. Of these 8, he dose not want to borrow mathematics part II,unless mathametic part I is also borrowed . In how many ways can he choose three books to be borrowed?

363) In how many ways can a cricket team be selected from a group of 25 players containing 10 batsmen, 8 bowlers, 5 all-rounders and 2 wicketkeepers, assuming that the team of 11 players requires 5 batsmen, 3 all rounders, 2 bowlers and 1wicket keeper?

364) If $^{28}C_{2r} : {}^{24}C_{2r-4}$ = 225 : 11 , find r

365) Prove that $^{2n}C_n = \frac{2^n 1.3.5...(2n-1)}{n!}$

366) Evaluate $^{20}C_5 + \sum_{r=1}^{5} {}^{25-r}C_4$

367) For the post of 5 teachers, there are 23 applicants, 2 posts are reserved for SC candidates and there are 7 SC candidates among the applicants. In how many ways can the selection be made?

368) A ccommittee of 5 is to be formed outof 6 gents and 4 ladies. In how many ways this can be done, when
(i) atleast two ladies are included ?
(ii) atmost two ladies are included ?

369) A box contains two white, three black and four red balls. In how many ways can three balls be drawn from the box, if atleast one black ball is to be included in the draw

370) Find the number of ways in which we can choose a committee from 4 men and 6 women, so that the committee includes atleast 2 men and exactly twice as many women as men

371) A candidate is required to answer 7 qustions out of 12 questions, which are divided into two groups each containing 6 questions. He is not permitted to attempt more than 5 questions from either group. Find the number of different ways of doing questions

372) There are 10 points in a plane, no three of which are in same straight line, excepting 4 points, which are collinear.
(i)Find the number of straight line obtained from the pair of these points
(ii) Find the number of triangles that can be fromed with the vertices asthese points.

373) Find the total number of words formed by 2 vowels and 3 consonants taken from 4 vowels and 5 consonants.

374) hom many words each of 3 vowels and 2 consonants can be formed from the letters of thje word 'INVOLUTE'?

375) A committee of 8 is to be formed from 7 gentleman and 8 ladies.In how many ways is atleart 4 ladies have to be included in a committee?

376) A man has 8 friends. In how many ways, can be invite one or more them to party

377) if x denotes the number of permutations of (n+2) things taken all at a time, y denotes the number of permutations of n things taken 12 at a time and z denotes the number of permutation of n-12 things taken all at a time such that x=132yz, find the value of n

378) How many 4-digit numbers can be formed by using the didits 1 to 9 , if repetition of digits is not allowed?

379) How many 3 letters words can be made using the lettes of the word 'ORIENTAL'?

380) Find how many arrangement can be made with the letter of the word 'MATHEMATICS'?

381) How many words can be formed using the letter A thrice, the letter B twice and the letter C thrice?

382) In how many ways can the letter of the word 'PENCIL' be arranged so that N and E are always together?

383) How many different words can be formed with the letters of the word 'TRIANGLE' So that the word being with T and end with E.

384) From a group of 15 cricket players, a team of 11 players in to be chosen . In how many ways can this be done?

385) In how many ways a committee of 3 men and 2 women can be chosen fronm 7 men and 5 women ?

386) 7 points lie on a circle . How many chords can be drawn by joining these points?

387) A flag is in the form of three blocks, each to be coloured differently . If there are 8 different colours to hoose from , then how many flags are possible?

388) How many 4 letters code can be formed using the first 10 letter of the English alphabet, if no letters can be repeated?

389) How many 5 digit telephone number can be constructed using the dgits 0to9, if each number starts with 67 (e.g 67125) and no digit appear more than once?

390) How many 3 digit numbers can be formed usingthe digits 0, 2, 3, 6, 8, when the digits may be repeated any number of times ?

391) A coin is tossed 6 times and the out comes are recrded. how many possible outcomes are there?

392) In how many ways 5 rings of diifferent types can be worn in 4 fingers

393) Find the number of ways in which 8 distinct toys can be distrbute among 5 children

394) In how many ways can three jobs I,II and III be assigned to three persons A,B and C , if one oerson is assigned only one job and all are capable of doing each job?

395) From among the 35 teachers in aschool, one pricipal and one vice principal are to be appointed. In how many ways can this be done?

396) How many 3-digit numbers can be formed from the digits 1,2,3,4 and 5 assuming repetition of digits not allowed?

397) Find the number of positive integers greater than 6000 and less than 7000 which are divisible by 5, provided that no digit is to be repeated.

398) How many 3-digit numbers can be formed from the digits 1, 2, 3, 4 and 5 assuming that
(i) repetition of the digits is allowed?
(ii) repetition of the digits is not allowed?

399) The straight lines l_1, l_2 and l_3 are parallel and lie in the same plane. A total numbers of m points are taken on l_1 : n points on l_2 : k points on l_3 . Find the maximum number of triangles formed with vertices at these points.

400) $find\ r\ if\quad {}^9P_5 + 5.\quad {}^9P_4 = {}^{10}P_r$

401) If $\frac{n!}{5!(n-1)!}$ and $\frac{n!}{7!(n-3)!}$ are in the ratio 21: 1, find the value of n.

402) In how many ways can a cricket eleven be chosen out of a batch of 17 plays if

(i) there is no restriction on the selection

(i) a particular player is always chosen

(iii) a particular player is never chosen

403) If $^{22}P_{r+1}$: $^{20}P_{r+2}$ = 11:52, find r.

404) Each of the six squares in the strip is to be coloured with anyone of 10 different colours so that no two adjacent squares have the same colour. Find the number of ways of colouring the strip.

405) Ten different letters of English alphabet are given. Words with five letters are formed from these given letters. Find the number of words which have atleast one letter repeated.

Case Study Questions   2 x 4 = 8

406) Mr. Arvind Shukla a mathematics teacher of class XI. He writes a word INDEPENDENCE on the white board. He asks some questions which are based on the arrangements of the letters of the above word. Then, answer the following questions.

(i) The number of permutations of n objects, where p objects are of the one kind, p_2 are of second kind, ...p_k are of kth kind and the rest, if any are of dfferent kind is

(a) $\frac{n!}{p_1!p_2!\ldots p_k!}$ **(b)** $\frac{n!}{p_1!+p_2!+\ldots+p_k!}$ **(c)** $\frac{n!}{p!}$ **(d) None of these**

(ii) Find the number of arrangements of the letters of the word starting with P.

(a) 183600   **(b)** 128600   **(c)** 138600   **(d)** 118600

(iii) Find the number of arrangements of the letter of word, when all the vowels always occur together.

(a) 18600 **(b)** 16800 **(c)** 17600 **(d)** 19600

(iv) Find the number of arrarngements of the letter of word, when all the vowels never occur together.

(a) 1646400   **(b)** 1545400   **(c)** 144400   **(d)** 156600

(v) Find the number of arrangements of the letter of word when wor begins with Iand ends in P

(a) 16200 **(b)** 12600 **(c)** 14200 **(d)** 15200

407) Mr. Ankt Triwedi a mathematics teacher of class XI write two things about Mohan and Sohan, which are below in figure.

	Mohan	Sohan
Age	^nP	$^nP_{r+1}$
Height (in feet)	^nC_r	$^nC_{r-1}$

Now,answer the following question which are based on above data.

(i)) If the age of mohan and Sohan are equal, then find the value of (n -r).

(a) 1   **(b) -1**   **(c) -2**   **(d) 2**

(ii) Which of the following formula is used to find ^nP_r ?

(a) $\frac{n!}{(n-r)!}$ **(b)** $\frac{(n-r)!}{n!}$ **(c)** $\frac{n!}{(n+r)!}$ **(d)** $\frac{n!}{r!(n-r)!}$

(iii) If the height of Mohan and Sohan are equal, then find the value of (n - 2r).

(a) 1   **(b) -1**   **(c) 2**   **(d) -2**

(iv) Find the age of Mohan.

(a) 6 yr (b) 4 yr (c) 8 yr (d) 9 yr

(v) Find the height of Sohan

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

5 Marks   40 x 5 = 200

408) What is the number of ways of choosing 4 cards from a pack of 52 playing cards? In how many of these

(i) four cards are of the same suit,

(ii) four cards belong to four different suits,

(iii) are face cards,

(iv) two are red cards and two are black cards,

(v) cards are of the same colour?

409) Find the number of 4-digit numbers that can be formed using the digits 1, 2, 3, 4, 5 if no digit is repeated. How many of these will be even?

410) In how many ways can the letters of the word PERMUTATIONS be arranged if the
(i) words start with P and end with S
(ii) vowels are all together
(iii) there are always 4 letters between P and S?

411) Find the value of n such that
(i) $^nP_5 = 42 \ ^nP_3$, n > 4
(ii) $\frac{^nP_4}{^{n-1}P_4} = \frac{5}{3}, n > 4$

412) Find r, if $5 \ ^4P_r = 6 \ ^5P_{r-1}$.

413) Find the number of different 8-letter arrangements that can be made from the letters of the word DAUGHTER so that
(i) all vowels occur together
(ii) all vowels do not occur together.

414) In how many ways can 4 red, 3 yellow and 2 green discs be arranged in a row if the discs of the same colour are indistinguishable?

415) Find the number of arrangements of the letters of the word INDEPENDENCE. In how many of these arrangements,
(i) do the words start with P
(ii) do all the vowels always occur together
(iii) do the vowels never occur together
(iv) do the words begin with I and end in P?

416) The number of permutations of n different objects taken r at a time, where repetition is allowed, is n^r.

417) Find the number of ways in which 5 boys and 5 girls be seated in a row, so that
(i) all the girls sit together.

418) How many numbers greater than 1000000 can be formed by using the digits 2, 3, 0, 3, 4, 2, 3?

419) Find the number of ways in which 5 boys and 5 girls be seated in a row, so that
(ii) all the girls and all the boys sit together.

420) Find the number of ways in which 5 boys and 5 girls be seated in a row, so that
(iii) all the girls are never sitting together.

421) If $^nC_{r-1}$ = 36. ^nC_r = 84 and $^nC_{r+1}$ = 126 then find $^rC_2$

422) How many 6-digit numbers can be formed from the digits 0, 1, 3, 5, 7 and 9 which are divisible by 10 and no digit is repeated?

423) There are 6 english , 4 sanskrit and 5 hindi books . In how many ways can they be arranged on a shelf soas to kkep all the books of the same language together?

424) In a class of 10 students, there are 4 girls A,B,C and D .In how many diferents ways can they be arrange in a row such that no two of the four girls are consecutive.

425) In how many ways can the letters of the word 'STRANGE' be arranged so that the vowels occupy only the ood plces?

426) In how many ways can the letters of the word 'ARRANGE' be arranged so thet the two R's are never together?

427) In how many ways can 21 indentical books on English and 19 identical books on hindi be placed in a row on a shelf so that two books on hindi may nat be together?

428) If the different permutations of the word 'EXAMINATION' are listed as in a dictionary, then how many words are there in the list before the first words are there in the list before the first word starting with E?

429) Out of 5 men and 2 womens, a committee of 3 is to be formde . In how many ways can it be formed , if atleast one women is to be included?

430) There are 12 points in a plane of which 5 points are collinear. Find the number of lines obtained by joining thesse pointsin pairs

431) Three balls are drawn from a bag containing 5 red 4 White and 3 black balls , find the number of ways in which this can be done , if alteast 2 balls are red.

432) Find the number of combinations , whwn some or all of n objects are taken at a time.

433) How many automobile lincene plates can be made, if each plate contains two different letters followed by three different digits?

434) How many odd number les then 100 can be formed by using the digits 0, 2, 5, 7 when the repetition of digitsis allowed?

435) In how many ways can 10 books be arranged on ashelf ,so that a particular pair of books shall be
(i)always together
(ii)never together

436) In how many ways can 6 balls of different colours, namely white , black, blue, red, gren and yellow be arranged in a row in such a way that the white and block balls are never together?

437) How many numbers divisible by 5 and lying betweenn 300 and 4000 can be formed by using the digits 3,4,5,6,7,8 when no digit is repeated in any sunch number?

438) How many different numbers, greater than 50000 can be formed by using the digits 0,1,1,5,9 ?

439) The letters of the word 'SURITI' are written in all posssible orders and these words are writen out as in a dictionary. Find the rank of the word 'SURITI'

440) How many different selection of 4 books can made from 10 different books, if
(i)There id no restriction?
(ii) Two particular books are always selected?
(iii) Two particular books are never selected?

441) A group consist of 4 girls and 7 boys . In how many ways, a team of 5 members be selected, if the team has
(i) no girl ?
(ii) atleas one boy and on girl ?
(iii) atleast 3 girls ?

442) A student has to answer 10 questiion choosing atleast 4 from each part A and B . If there are 6 question in part A and 7 question from part B, in how many ways can the student choose 10 queations?

443) There are 4 routes between Delhi and Patna. In how many different ways can a man o from Delhi to Patna and return , if for returning
(i) any of the routes is taken ?
(ii) the same routes is taken ?
(iii) the same routes is not taken ?

444) Find the number of arrangements of the letters of the word 'INDEPENDENCE' . In how many of these arrangements
(i) do the words start with P?
(ii) do all the vowels always occur together?
(iii) do all the vowels never occur together ?
(iv) do the words begin with I and end in P?

445) Using the digits 1,2,3,4,5,6,7,a number of different digit is formed . Find how many numbers are formed ? Further , Find how many of these are
(i) exactly divisible by 2 ?
(ii) exactly divisible by 25 ?
(iii) exactly divisible by 4 ?

446) Find if $^5P_r = {}^6P_{r-1}$

447) How many numbers are there between 100 and 1000 such that at least one of their digits is 7?

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