7.PERMUTATION AND COMBINATION

SECTION A (1 mark)

MCQ

1.5 boys are to be arranged in a row. If two particular boys desire to sit in end places, the number of possible arrangements is

      a) 60   b) 120   c) 240   d) 12

2.The number of four-digit numbers formed out of 1,2,3,4 with at least one repetition is

      a) 24   b) 256   c) 232   d) 144

3.If $^n p_r = 3024$, then n is

      a) 0   b) 8   c) 7   d) 9

4.If $^{n-1} p_3 : {}^{n+1} p_3 = 5 : 12$ then n is

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

5.If $^{27} p_8 - {}^{26} p_8 = x^m p_n$ then the value of x is

      a) 6   b) 7   c) 8   d) 3

6. The letters of the word **'RANDOM'** are arranged in all possible ways. The number of arrangements in which there are two letters between R and D is

      a) 48   b) 72   c) 144   d) 120

7.The letters of the word **'REGULATIONS'** are arranged in all possible ways. Then the number of arrangements in which there are four letters between R and E is

      a) 528   b) 628   c) 728   d) $12 \times 9!$

8.Four boys and four girls are to be arranged in a row. The number of arrangements in which they come alternately is

      a) 576   b) 288   c) 144   d) 1152

9. The letters of the word **'HOSTEL'** are arranged so that vowels occupy even places. The number of possible arrangements is

      a) 48   b) 72   c) 144   d) 24

10. The letters of the word **'CONTINUE'** are arranged in all possible ways. If the order of the vowels is not be considered, the number of possible arrangements is

    a) 1680   b) 840   c) 420   d) $\dfrac{8!}{2!}$

FILL IN THE BLANKS.

1.   If there are n students and r prizes (r < n) and a student can receive any number of prizes, then in ……….. number of ways the prizes can be given away to the students.

2.   The number of permutations of the word 'BANANA' is ………………..

3. In ………… number of ways five identical balls can be distributed among ten identical boxes if not more than one can go into a box.

4.If repetitions are not allowed, the number of three digit odd numbers formed out of 0,1 2, 3,...9 is …………….

5.   If (n + 2)! = 2550 n! then the value of n is ………………

<u>**VSA QUESTIONS**</u>

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

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

3.Find the total number of ways of answering 5 objective type questions, each question having 4 choices.

4.How many numbers are there between 100 and 1000 such that every digit is either 2 or 9?

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

6.If there are 12 persons in a party and if each two of them shake hands with each other, how many handshakes happen in the party?

7.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?

8.   There are 4 multiples chose questions in an examination. How many sequences of answers are possible? if each equation has 2 choices?

9.   In how many ways distinct ways can the product xy^2z^2 be written without using exponents?

SECTION B (2 MARKS)

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

11 A gentleman has 6 friends to invite. In how many ways can he send invitation cards to them, if he has three servants to carry the cards?

12. If $(n + 1)! = 12(n - 1)!$ then find n.

13. If $\dfrac{{}^nP_4}{{}^{n-1}P_4} = \dfrac{5}{3}$, find n

14. Find the number of ways in which the letters of the word TRIANGLE can be arranged such that no two vowels are together.

15.   How many numbers greater than 40000 can be formed using the digits 1,2,3,4, and 5 if each digit is used only once in a number.

16.   There are 15 points in a plane, no three of which are collinear except 6.How many triangles can be formed by joining them.

17.   We wish to select 6 persons from 8, but if the person A is chosen, then B must be chosen. In how many ways can selection be made?

18.   Find n and r, if $^nc_r : {}^nc_{r+1} : {}^nc_{r+2} = 1:2:3$

SECTION C (4MARKS)

19. How many natural numbers from 1 to 1000 have none of the digits repeated?

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

21. How many words each of 3 vowels and 2 consonants can be formed from the letters of the word 'INVOLUTE'?

22. How many odd numbers less than 10,000 can be formed using the digits 0,2,3,5 allowing repetition of digits?

23. How many numbers are there between 100 & 1000 such that at least one of the digits is 6 ?

24 How many three digit numbers are there which have exactly one of the digits as 6?

25. Rohit wants to arrange 4 English, 3 Math and 2 Physics books on a shelf. If the books on the same subject are different, determine the number of all possible arrangements.

26. In an examination hall there are four rows of chairs. Each row has 8 chairs one behind the other. There are two classes sitting for the examination with 16 students in each class. It is desired that in each row all students belong to the same class and that no two adjacent rows are allotted to the same class. In how many ways can these 32 students be seated?

27. How many six digits telephone numbers can be made if each number starts with 35 and no digit appears more than once?

28. How many words can be formed by using all the letters of the word ALLAHABAD? How many of these words will not contain both L together?

29. A committee of 5 is to be formed out of 6men and 4 women. In how many ways can this be done if
(i) at least 2 women are included
(ii) at most 2 women are included
Find the relation between number of people who progress in life and punctual people. How does the punctuality important in the progress of life?

30. In how many ways, the letters of ALGEBRA can be arranged in a row if
(i) two A's are together?   (ii) two A's are not together ?

31. A boy has 3 library tickets and 8 books are of his interest. Of these 8, he does not want to borrow Mathematics Part II, unless Maths Part I is also borrowed? In how many ways can he choose the three books to be borrowed?

32. In how many ways can three prizes be distributed among 4 boys when

(i) No one gets more than one prize
(ii) A boy can get any number of prizes

33. If the letters of the word RACHIT are arranged in all possible ways as listed in dictionary, then what is the rank of the word RACHIT?

34. Three married couples are to be seated. In a row having six seats in a cinema hall. If spouses are to be seated next to each other, in how many ways can they be seated? Find also the number of ways of their seating if all the ladies sit together.

SECTION D (6 MARKS)

35. How many words can be formed by taking 4 letters at a time using the letters of the words
i) *MATHEMATICS*   ii) *INEFFECTIVE*

36 How many different numbers of six digits (without repetition of digits) can be formed from
the digits 3,1,7,0,9,5?
       (i)How many of them will have 0 in the unit's place?
       (ii) How many of them are divisible by 5?
       (iii) How many of them are not divisible by 5?

37. In how many ways can 11 players can be chosen out of 15 if
       (i)   there is no restriction.
       (ii)   a particular player is always chosen.
       (iii)   a particular player is never chosen.

38. In how many ways the letters of the word "CONSTANTINOPLE " are to be arranged in the
   following manner
          i. there is no restriction
         ii. begin with A
        iii. end with A
        iv. have S in the 3rd place with E at the end?

39. The letters of the word 'RANDOM' are written in all possible orders and these words are
written out as in a dictionary. Find the rank of the word 'RANDOM'

■■

ANSWER KEY

MCQ

A1. 12   A2. 232   A3. 9   A4. 8   A5. 8   A 6.144   A7.12x9!   A8 1152
A9. 144   A10. 840

FILL IN THE BLANKS

A1. n^r A2. 60   A3 $^{10}C_5$
A4 320   A5. 49

1	5
2	30
3	1024
4	8
5	4
6	66
7	2880
8	16
9	30
10	5
11	739
12	3
13	10
14	14400
15	48
16	435
17	22
18	14,4
19	738
20	320
21	2880
22	128
23	252
24	225
25	362880
26	$2(16!)^2$
27	1680
28	1680
29	186,180
30	720,1800
31	41
32	24,64

33	481	
34	48,144	
35	i)2454 ii)1422	
36	120,216,384	
37	1365,1001,364	
38	(i)	14! /24
	(ii)	13! /24
	(iii)	13! /24
	(iv)	12! /24
39.	614	