PERMUTATIONS

1. Find the value of ${}^{9}P_5$, ${}^{6}P_4$, ${}^{10}P_7$, ${}^{n}P_n$.

2. If ${}^{n}P_4 = 360$, find the value of n.

3. If ${}^{9}P_r = 3024$, find the value of r.

4. If ${}^{n}P_4 = 12 \times {}^{n}P_2$, find the value of n.

5. If ${}^{2n+1}P_{n-1} : {}^{2n-1}P_n = 3:5$, find the value of n.

6. If ${}^{n}P_5 : {}^{n}P_3 = 2:1$, find the value of n.

7. Prove that:
   ${}^{1}P_1 + 2.\,{}^{2}P_2 + 3.\,{}^{3}P_3 + ... + n.\,{}^{n}P_n = {}^{n+1}P_{n+1} - 1$.

8. In how many ways can the letters of the word CIVILISATION be re-arranged?

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

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

11. 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?

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

13. How many 4-digit numbers are there with no digit repeated?

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

15. Find the value of n such that:
    (i) ${}^{n}P_5 = 42\,{}^{n}P_3, n > 4$ (ii) $\frac{{}^{n}P_4}{{}^{n-1}P_4} = \frac{5}{3}, n > 4$

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

17. Number of words that can be formed with the letters of the words BIHAR.
    (a) 120 (b) 130
    (c) 140 (d) 110

18. In how many different ways, other than the given one, can the letters A, B, C, D be arrangement in a row?
    (a) 20 (b) 21
    (c) 22 (d) 23

19. How many numbers of four digits can be formed with the digits 1, 2, 3, 4, 5, if the digits can be repeated in the same number?
    (a) 120 (b) 625
    (c) 635 (d) 645

20. If ${}^{n}P_s = 20 \times {}^{n}P_3$ then find the value of n.

21. If ${}^{22}P_{r+1} : {}^{20}P_{r+2} = 11:52$ then find the value of r.

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

23. Find the number of numbers of 5 digits that can be formed with the digits 0, 1, 2, 3, 4, if the digits can be repeated in the same number.

24. How many four digit numbers can be formed using the digits 1, 2, 3, 4, 5 such that at least one of the digit is repeated
    (a) $4^4 - 5!$ (b) $4^5 - 4!$
    (c) $5^4 - 4!$ (d) $5^4 - 5!$

25. If ${}^{12}p_r = {}^{11}p_6 + 6\,{}^{11}p_5$ then r is equal to
    (a) 4 (b) 8
    (c) 6 (d) none of these

26. If ${}^{12}P_r = 1320$, then r is equal to: **[UPSEE-2000]**
    (a) 5 (b) 4
    (c) 3 (d) 2

27. If ${}^{n}P_4 = 24\,{}^{n}C_5$, then the value of n is **[KCET-2001]**
    (a) 10 (b) 15
    (c) 9 (d) 5

28. If ${}^{22}P_{r+1} : {}^{20}P_{r+2} = 11:52$ then the value of r is
    (a) 4 (b) 5
    (c) 6 (d) 7

29. The value of $\sum_{m=1}^{n} m.\,{}^{m}P_m$ is
    (a) 11! (b) 11! − 1
    (c) 11! + 1 (d) none of these

30. The value of $\sum_{m=0}^{n}\left(\sum_{r=0}^{m}\frac{{}^{m}P_{r}}{r!}\right)$ is

(a) $2^{n}-1$ (b) $2^{n}+1$

(c) $2^{n+1}-1$ (d) $2^{n+1}+1$

31. The number of five-digit telephone numbers having at least one of their digits repeated is

(a) 90000 (b) 100000

(c) 30240 (d) 69760

32. If ${}^{m+n}P_{2}=90$ & ${}^{m-n}P_{2}=30$, then (m, n) is given by

(a) (7, 3) (b) (16, 8)

(c) (9, 2) (d) (8, 2)

33. The total number of permutations of $n(>1)$ different things taken not more than r at a time, when each thing may be repeated any number of times is _____.

34. The number of ways of arranging 2m white and 2n red counters in a straight line so that each arrangement is symmetrical with respect to a central mark is _____.