JEE MAIN : CHAPTER WISE TEST PAPER-7

SUBJECT :- MATHEMATICS **DATE.....**
CLASS :- 11th **NAME.....**
CHAPTER :- PERMUTATION & COMBINATION **SECTION.....**

(SECTION-A)

1. A multiple choice exam has 20 questions, and each question has 5 possible answers. The same 5 answers for each question will appear on each examination paper, but they can appear in any order. The questions will appear in the same order on every examination paper. Number of different examination papers that can be printed are
(A) 5^{20} (B) P(20, 5)
(C) $\frac{20!}{5!}$ (D) $(5!)^{20}$

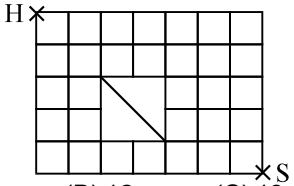
2. Number of ways in which 4 married couples can be seated round a table such that men and women are alternate and not all women adjacent to her husband, is
(A) 144 (B) 132 (C) 120 (D) 36

3. There are 3 men and 7 women taking a dance class. Number of different ways in which each man be paired with a woman partner, and the four remaining women be paired into two pairs each of two, is
(A) 105 (B) 315 (C) 630 (D) 450

4. The number of permutation of the letters AAAABBBC in which the A's appear together in a block of four letters or the B's appear in a block of 3 letters, is
(A) 44 (B) 50 (C) 60 (D) none

5. The number of ordered quadruples (a_1, a_2, a_3, a_4) of positive odd integers that satisfy $a_1 + a_2 + a_3 + a_4 = 32$ is equal to
(A) 286 (B) 4495
(C) 680 (D) 4040

6. The figure shows the plan of a town where all the street blocks are square. In the middle of the town is a park with a diagonal road through it. Madhuri walks every day from her house at H to her school at S, always taking one of the shortest routes. The number of different shortest routes that she can choose is



(A) 6 (B) 12 (C) 18 (D) 24

7. A set contains (2n + 1) different elements . The number of subsets of the set which contains more than n elements is :
(A) 2^{n-1} (B) 2^n (C) 2^{n+1} (D) 4^n

8. A convex polygon has 44 diagonals. The polygon is
(A) nonagon (B) decagon
(C) undecagon (D) Dodecagon

9. Number of 9 lettered words that can be formed using all the letters of the word 'MEENANSHU' if alike letters are never adjacent, is k(7!). Then 'k' lies in the interval
(A) [1, 5] (B) (5, 10]
(C) (10, 15] (D) (15, 20]

10. Number of zeros at the end of the number N = $\frac{132!}{2^{104}5^{19}}$ is
(A) 6 (B) 13 (C) 26 (D) 47

11. A train is going from London to Cambridge stops at 12 intermediate stations. 75 persons enter the train during the journey with 75 different tickets of the same class . Number of different sets of tickets they may be holding is
(A) $^{78}C_3$ (B) $^{91}C_{75}$ (C) $^{84}C_{75}$ (D) none

12. In a plane a set of 8 parallel lines intersects a set of n parallel lines, that goes in another direction, forming a total of 1260 parallelograms . The value of n is :
(A) 6 (B) 8 (C) 10 (D) 12

13. 5 different objects are to be distributed among 3 persons such that no two persons get the same number of objects. Number of ways this can be done, is
(A) 60 (B) 90 (C) 120 (D) 150

14. Number of zero's at the end of $\prod_{n=5}^{30}(n)^{n+1}$ is
(A) 111 (B) 147 (C) 137 (D) none

15. Two players P_1 & P_2 play a series of 2n games each game can result in either a win or a loss for P_1. The total no. of ways in which P_1 can win the series of these games is equal to
(A) $\frac{1}{2}\left(2^{2n} - {}^{2n}C_n\right)$ (B) $\frac{1}{2}\left(2^{2n} - 2\times {}^{2n}C_n\right)$
(C) $\frac{1}{2}\left(2^{n} - {}^{2n}C_n\right)$ (D) $\frac{1}{2}\left(2^{n} - 2\times {}^{2n}C_n\right)$

16. A man wants to buy 'm' mangoes in 'n' different varieties, mangoes of the same variety being identical and they are available in abundance. Number of different ways he can plan his purchases, if he has to buy atleast two mangoes of the same variety is

(A) ${}^{m-2}C_{n-1}$ (B) ${}^{m+n-3}C_{m-1}$

(C) ${}^{m+n-1}C_m - {}^nC_m$ (D) $\frac{{}^{m+n-1}P_{n-1} - {}^nP_m}{m!}$

17. Sixteen players $S_1, S_2, S_3, \ldots\ldots, S_{16}$ play in a tournament. Number of ways in which they can be grouped into eight pairs so that S_1 and S_2 are in different groups, is equal to

(A) $\frac{(14)!}{2^6 \cdot 6!}$ (B) $\frac{(15)!}{2^7 \cdot 7!}$

(C) $\frac{(14)!}{2^7 \cdot 6!}$ (D) $\frac{(14)!}{2^6 \cdot 7!}$

18. There are 3 straight lines, 4 circles and 5 parabolas in xy plane. Maximum number of their intersection point, is

(A) 129 (B) 149 (C) 169 (D) 189

19. Two variants of a test paper are distributed among 12 students . Number of ways of seating of the students in two rows so that the students sitting side by side do not have identical papers and those sitting in the same column have the same paper is :

(A) $\frac{12!}{6!6!}$ (B) $\frac{(12)!}{2^5.6!}$

(C) $(6!)^2 \cdot 2$ (D) $(6!)^2 \cdot 2^2$

20. Two different packs each containing 52 playing cards are shuffled together . The number of ways in which a man can be dealt 26 cards so that he does not get two cards of the same suit and same denomination is :

(A) $2^{26} - 1$ (B) $2^{52} - 1$

(C) ${}^{52}C_{26} \cdot 2^{26}$ (D) none

(SECTION-B)

21. Number of permutations of all the letters in "ANABLAVA" that does not end with A can be expressed in the form of $\frac{m!}{n!}$, find (m + n)

22. Find the value of k if there are 820 ways in which k identical balls are distributed in 3 distinct boxes when each box can hold any number of balls, and no box remains empty.

23. One commercially available ten button lock may be opened by by pressing in any order the correct five buttons. The sample shown below has {1, 2, 3, 6, 9} as its combination. Suppose that these locks are redesigned so that sets of as many as nine buttons or as tens as one button could serve as combination. How many additional combination would this allow?

24. How many ways are there to arrange four letters from the letters of the word “TATTERS”?

25. A person has 3 sons. He owns 101 shares of the same amount of a company. He wants to give these shares to his sons so that no son should have more shares than the combined total of the other two. Find the number of ways in which he can distribute the shares.

26. Find the number of ways in which 3 blue, 4 white and 2 red balls can be distributed into 4 distinct boxes if each box can have any number of balls. Assume that balls of the same colour to be alike.

27. Find the number of four letter words which can be made using the letters of the word "HIPPOPOTAMUS". If atleast 1 letter is repeated.

28. How many 7 digit number are there such that the digits are distinct integer taken from the set S = {1, 2, 3, 4, 5, 6, 7, 8, 9} and such that the integer 5 and 6 do not appear consecutively in either order.

29. If the letters of the word 'RAMAYAN' are written down in all possible manner as they are in the dictionary, then find the rank of the word Ramayan.

30. Consider a class of 5 girls and 7 boys. The number of different teams consisting of 2 girls and 3 boys that can be formed from this class, if there are two specific boys A and B, who refuse to be the members of the same team, is