MATHS

BOOKS - SAI MATHS (TELUGU ENGLISH)

PERMUTATIONS AND COMBINATIONS

Problems

1. $\sum_{r=0}^{10}(40-r)C_5 =$

A. ${}^{41}C_5 - {}^{30}C_5$

B. ${}^{41}C_6 - {}^{30}C_6$

C. ${}^{41}C_5 + {}^{30}C_5$

D. ${}^{41}C_6$

Answer: B

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2. IF a polygon has 35 diagonals , then the number of sides of the polygon is

A. 12

B. 9

C. 10

D. 11

Answer: C

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3. The number of four-digit numbers formed by using the digits 0,2,4,5 and which are not divisible by 5, is

A. 10

B. 8

C. 6

D. 4

Answer: B

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4. T_m denotes the number of triangles that can be formed with the vertices of a regular

polygon of m sides . If $T_{m+1} - T_m = 15$ then m=

A. 3

B. 6

C. 9

D. 12

Answer: B

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5. Out of thirty points in a plane , eight of them are collinear . The number of strainght lines that can be formed by joining these points is

A. 296

B. 540

C. 408

D. 348

Answer: C

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6. If n is an integer with $0 \leq n \leq 11$, then the minimum value of n!(11 - n)! is attained when a value of n equals to

A. 11

B. 5

C. 7

D. 9

Answer: B

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7.

$^nC_{r-1} = 330, {}^nC_r = 462, {}^nC_{r+1} = 462 \Rightarrow r =$

A. 3

B. 4

C. 5

D. 6

Answer: C

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8. 10 men and 6 women are to be seated in a row so that all women sit together. The number of ways they can be seated, is

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9. IF T_n dentoes the number of triangle formed with n points in plane no three of which are collinear and If $T_{n+1} - T_n = 36$ then n=

A. 7

B. 8

C. 9

D. 10

Answer: C

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10. A regular polygon of n sides has170 digonals . Then n=

A. 12

B. 17

C. 20

D. 25

Answer: C

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11. Acommittee of 12 members is to formed from 9 women and 8 men . The number of

committee in which the women are in majority is

A. 2720

B. 2702

C. 2270

D. 2278

Answer: B

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12. A student is asked to answer 10 out of 13 questions is an examination such that he must answer atleast four questions from the first five questions. The number of choices available to him is

A. 63

B. 91

C. 161

D. 196

Answer: C

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13. $\sum_{k=1}^{\infty}\sum_{r=0}^{k}\frac{1}{3^k}\left({}^kC_r\right)$ is equal to

A. $\frac{1}{3}$

B. $\frac{2}{3}$

C. 1

D. 2

Answer: D

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14. A bag contains n white and n black balls . Pairs of balls are drawn at random without replacement successively , until the bag is empty . If the number of ways in which each pair consists of one white and one black ball is 14,400 then n=

A. 6

B. 5

C. 4

D. 3

Answer: B

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15. the number of five digit numbers divisible by 5 that can be formed using the numbers 0,1,2,3,4,5 without repretition is

A. 240

B. 216

C. 120

D. 96

Answer: B

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16. ${}^{15}P_8 = A + 8.\ {}^{14}P_7 \Rightarrow A =$

A. ${}^{14}P_6$

B. ${}^{14}P_s$

C. ${}^{15}P_7$

D. ${}^{16}P_9$

Answer: B

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17. If ${}^{(n+1)}C_3 + {}^{(n-1)}C_4 > {}^{n}C_3$, then the minimum value of n is

A. 5

B. 6

C. 7

D. 8

Answer: D

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18. Let $n = 1! + 4! + 7! + \ldots + 400!$ then ten's digit of n is

A. 1

B. 6

C. 2

D. 7

Answer: B

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19. Let $a_n = \frac{10^n}{n!}$ for n = 1, 2, 3,... then the greatest value of n for which a_n is the greatest is

A. 11

B. 20

C. 10

D. 8

Answer: C

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20. A polygon has 14 diagonals. Then, the number of its sides is

A. 7

B. 9

C. 10

D. 12

Answer: A

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21. The number of subsets of (1, 2, 3...9) containing at least one even number is

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22. P points are chosen on each of the three coplanar lines. The maximum number of triangles formed with vertices at these points is

A. $p^3 + 3p^2$

B. $\frac{1}{2}(p^3 + p)$

C. $\frac{p^2}{2}(5p - 3)$

D. $p^2(4p - 3)$

Answer: D

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23. A binary sequence is an array of '0' s and 1's . The number of n- digit binary sequences which contain even number of 0 s is :

A. 2^{n-1}

B. $2^n - 1$

C. $2^{n-1} - 1$

D. 2^n

Answer: B

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24. 9 balls are to placed in 9 boxes : and 5 of the balls cannot fit into 3 small boxes the

number of ways of arranging one ball in each of the boxes is

A. 18720

B. 18270

C. 17280

D. 12780

Answer: C

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25. If ${}^{n}P_{r} = 30240$ and ${}^{n}C_{r} = 252$ then the ordered pair (n,r)=

A. (12,6)

B. (10,5)

C. (9,4)

D. (16,7)

Answer: B

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26. Find the number of ways of arranging 8 men and 4 women around a circular table. In how many of them

no two women come together

A. 8!

B. 4!

C. 8!4!

D. 7! ${}^{8}P_{4}$

Answer: D

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27. IF a polygon of n sides has 275 diagonals then n=

A. 25

B. 35

C. 20

D. 15

Answer: A

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28. Eight different letters of an alphabet are given . Words of four letters from these are formed the number of such words with at least one letter repeated is

A. $\left(\frac{8}{4}\right) - {}^{8}P_4$

B. $8^4 + \left(\frac{8}{4}\right)$

C. $8^4 - {}^{8}P_4$

D. $8^4 - \left(\frac{8}{4}\right)$

Answer: C

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29. The number of natural numbers less than 1000, in which no two digits are repeated is

A. 738

B. 792

C. 837

D. 720

Answer: A

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30. A three digit number n is such that the last two digits of it are equal and different from the first , the number of such n's is

A. 64

B. 72

C. 81

D. 900

Answer: C

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31. s_1, s_2 .....,s_{10} are the speakers in a conference, If s_1 addresses only after s_2, then the number of ways the speakers address is

A. 10!

B. 9!

C. $10 \times 8!$

D. $\frac{10!}{2}$

Answer: D

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32. A person who tosses an unbiased coin gains two points for turning up a head and loses one point for a tail. If three coins are tossed and the total score X is observed, then the range of X is

A. {-3,0,3}

B. {-3,0,3}

C. {-3,0,3,6}

D. {-3,3,6}

Answer: C

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33. The number of positive odd divisors of 216 is

A. 4

B. 6

C. 8

D. 12

Answer: A

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34. For any integer $n \geq 1$, the number of positive divisors of n is denoted by d(n). Then for a prime P, $d\left(d\left(d\left(p^7\right)\right)\right.$ is equal to

A. 1

B. 2

C. 3

D. P

Answer: C

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35. Let I_1 and I be two lines intersecting at P. If A_1, B_1, C_1 are points on hi and A_2, B_2, C_2, D_2, E_2 are points on l_2 and if none of these coincides with P, then the number of triangles formed by these eight points, is

A. 56

B. 55

C. 46

D. 45

Answer: D

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36. Consider the fourteen lines in the plane given by $y = x + r, y = -x + r,$ where $r \in \{0, 1, 2, 3, 4, 5, 6)$. The number of squares

formed by these lines, whose sides are of length $\sqrt{2}$, is

A. 9

B. 16

C. 25

D. 36

Answer: C

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37. The least value of n so that ${}^{n}C_5 + {}^{n}C_6 > (n+1)C_5$ is

A. 10

B. 11

C. 12

D. 13

Answer: B

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38. The number of ways that 8 beads of different colours be strung as a necklace is

A. 2520

B. 2880

C. 4320

D. 5040

Answer: A

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39. The number of 5-digited numbers which are not divisible by 5 and which consist of different odd digits is

A. 24

B. 32

C. 96

D. 120

Answer: C

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40. The number of ways in which 5 boys and 4 girls sit around a circular table, so that all girls sit together

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41. Using the digits 0,2,4,6,8 not more than once in any number , the number of 5 digited number that can be formed is

A. 16

B. 24

C. 96

D. 120

Answer: C

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