30. COMBINATIONS

1. A student is allowed to choose atmost n books from a collection of $2n+1$ books. If the total number of ways in which he can select atleast one book is 255, then the value of n is

[AP EAMCET 17-09-20_Shift-2]

1. 4 2. 5
3. 6 4. 7

2. If $n = (210)^2(360)(143)$, then the total number of non trivial factors of n is

[AP EAMCET 17-09-20_Shift-2]

1. 256 2. 872
3. 1504 4. 1438

3. On an $n \times n$ chessboard, the total number of rectangles which are not squares is 350. Then the number of white squares on the chessboard is _____ **[AP EAMCET 17-09-20_Shift-2]**

1. 32 2. 50
3. 18 4. 72

4. In a apartment there are 30 kids. If each kids plays table tennis with other kid, then the total number of matches played by them

[AP EAMCET 18-09-20_Shift-1]

1. 30_{C_2} 2. 30_{P_2}
3. $30_{C_2} - 1$ 4. $30_{P_2} - 1$

5. A polygon has 54 diagonals. The number of sides of this polygon is ______

[AP EAMCET 18-09-20_Shift-1]

1. 12 2. 15
3. 16 4. 9

6. The crew of an 8-oar boat is to be chosen from 12 men, of whom 3 can row on the stroke side only. The number of ways in which the crew can be arranged is

[AP EAMCET 18-09-20_Shift-2]

1. ${}^9C_4 \times {}^8C_3 \times 3! \times 4!$ 2. ${}^9C_4 \times {}^8C_4 \times 4! \times 4!$
3. ${}^8C_3 \times {}^8C_3 \times 4! \times 3!$ 4. ${}^9C_4 \times {}^9C_4 \times 4! \times 4!$

7. Find the total number of rectangles on a normal chess board. **[AP EAMCET 18-09-20_Shift-2]**

1. ${}^8C_2 \times {}^8C_2$ 2. ${}^8C_2 + {}^8C_2$
3. ${}^9C_2 \times {}^9C_2$ 4. ${}^9P_2 \times {}^9P_2$

8. If ${}^nC_r$ denotes the number of combinations of 'n' things taken 'r' at a time, then the expression ${}^nC_{r+1} + {}^nC_{r-1} + 2\,{}^nC_r$ equals

[AP EAMCET 21-09-20_Shift-1]

1. ${}^{n+2}C_r$ 2. ${}^{n+2}C_{r+1}$
3. ${}^{n+1}C_r$ 4. ${}^{n+1}C_{r+1}$

9. If the number of rectangles formed on a chess board is 1296. Then the total number of squares formed on the chess board is.

[AP EAMCET 21-09-20_Shift-2]

1. 202 2. 203
3. 204 4. 205

10. In how many ways a committee of 6 members can be formed out of 10 members but always consisting of a special member?

[AP EAMCET 21-09-20_Shift-2]

1. $\frac{1}{2}\,{}^9P_5$ 2. ${}^9P_5$
3. ${}^9C_5$ 4. $\frac{1}{2}\,{}^9C_5$

11. If $n_{C_7} = n_{C_6}$, then $n_{C_2} =$

[AP EAMCET 22-09-20_Shift-1]

1. 858 2. 13
3. 1 4. 78

12. If ${}^{12}C_{2k-1} = {}^{12}C_{k+1}$, then find k

[AP EAMCET 22-09-20_Shift-2]

1. 3 2. 6
3. 9 4. 4

13. A regular polygon has 170 diagonals. Then the measure of interior angle of the polygon is

[AP EAMCET 22-09-20_Shift-2]

1. $\frac{5\pi}{8}$ 2. $\frac{9\pi}{10}$
3. $\frac{7\pi}{10}$ 4. $\frac{17\pi}{20}$

14. The number of ways of choosing a committee from four men and six women so that the committee includes atleast two men and exactly twice as many women as men is

[AP EAMCET 23-09-20_Shift-1]

1. 90 2. 92
3. 94 4. 96

15. From 5 consonants and 5 vowels, how many words can be formed using 3 consonants and 2 vowels? **[AP EAMCET 23-09-20_Shift-1]**

1. 12000 2. 2000
3. 20000 4. 1200

16. Find the number of marked points on the plane, if when connected pair wise by line segments, the total number of line segments formed is 15?

[AP EAMCET 23-09-20_Shift-1]

1. 5 2. 4
3. 6 4. 8

17. For which value of $n \in N$, n! has 13 trailing zeros? **[AP EAMCET 23-09-20_Shift-1]**

1. 51 2. 54
3. 57 4. 60

18. Ten points are marked on a circle. Number of distinct convex polygons of three or more sides can be drawn using some or all of the ten points as vertices is

1. 978 2. 1013
3. 968 4. 999

19. $Let\ X = \{(a,b) \mid a,b \in z, 0 \le a \le 20, 0 \le b \le 15\}$.
Then the number of rectangles with vertices in set X is

1. 25100 2. 25200
3. 25300 4. 25000

20. $If\ n \ge 100$ and the coefficient of x^{100} $in\ 1+(1+x)+(1+x)^2+......+(1+x)^n\ is\ {}^{201}C_{101}, then\ n =$

1. 100 2. 200
3. 101 4. 190

21. Let x denote the number of ways of selecting at least one ball from a bag containing 3 identical red balls, 4 identical blue balls and 5 identical green balls. Let y denote the number of ways in which a student will fail in an examination, when he has to write the examination in 5 different subjects. Then x + y =

[TS EAMCET 09-09-20_Shift-2]

1. 150 2. 151
3. 152 4. 301

22. At an election a voter may vote for any number of candidates not exceeding the number to be elected. If 4 candidates are to be elected out of the 12 contested in the election and voter votes for at least one candidate, then the number of ways in which a voter can vote is

[TS EAMCET 10-09-20_Shift-1]

1. 793 2. 298
3. 781 4. 1585

23. The number of integers x, y, z, w satisfying $x + y + z + w = 25$ and $x, y, z \ge -1,\ w \ge 1$, is

[TS EAMCET 11-09-20_Shift-1]

1. ${}^{28}C_3$ 2. ${}^{30}C_3$
3. ${}^{29}C_3$ 4. ${}^{31}C_3$

24. Consider the following statements:
I: The number of positive integral solutions of $x_1 + x_2 + x_3 + x_4 = 10$ is 286
II: If $25! = 10^n \times k, (k \in N)$ then n=6

[TS EAMCET 14-09-20_Shift-2]

1. Only I is true 2. Only II is true
3. Both I and II are true
4. Both I and II are false

25. A student is allowed to select at least (n+1) books but not all books from a collection of (2n+1) books. If the total number of ways in which he can select these books is 255, then the number of books in that collection is

[TS EAMCET 14-09-20_Shift-2]

1. 4 2. 9
3. 10 4. 7

26. A set contains 11 elements. The number of subsets of the set which contain at most 5 elements is

[AP EAMCET 20-08-2021_Shift-2]

1. ${}^{12}C_0 + {}^{12}C_2 + {}^{12}C_4$
2. ${}^{12}C_1 + {}^{12}C_3 + {}^{12}C_5$
3. ${}^{11}C_0 + {}^{11}C_1 + {}^{11}C_2 + {}^{11}C_4$
4. ${}^{11}C_0 + {}^{11}C_1 + {}^{11}C_2 + {}^{11}C_3$

27. A set of 10 parallel lines is intersected by another set of m parallel lines. If the total number of parallelograms formed by these two sets of lines is 675. Then $m =$

[AP EAMCET 23-08-2021_Shift-1]

1. 15 2. 10
3. 12 4. 6

28. The value of $\sum_{r=0}^{4} {}^{(19-r)}C_3 + {}^{15}C_4$ is equal to

[AP EAMCET 24-08-2021_Shift-2]

1. ${}^{21}C_4$
2. ${}^{19}C_4$
3. ${}^{20}C_4$
4. ${}^{16}C_4$

29. The number of integers from 1 to 1000 which are divisible by 2 or 3 is

[AP EAMCET 24-08-2021_Shift-2]

1. 88
2. 67
3. 58
4. 47

30. There are 10 points on the line AB excluding A and B and 8 points on AC excluding A & C. Number of triangles formed with these points not considering A, B, C is

[AP EAMCET 24-08-2021_Shift-2]

1. ${}^{18}C_3 - {}^{10}C_3$
2. 360
3. 640
4. 280

31. **Statement I:** The number of ways of distributing 10 identical balls in 4 distinct boxes such that no box is empty is ${}^{9}C_3$

Statement II: The number of ways of choosing 3 places from 9 different places is $9C_3$

[AP EAMCET 24-08-2021_Shift-1]

1. Statement I is true, statement II is not a correct explanation for statement II
2. Statement I is true, statement II is false
3. Statement I is false, statement II is true
4. Statement I is true, statement II is a correct explanation for statement I

32. The sum of integers from 1 to 50 that are divisible by 2 and 3 is

[AP EAMCET 24-08-2021_Shift-1]

1. 316
2. 6^3
3. 36
4. 48

33. The solution set of ${}^{5}C_{x-1} > 2.\left({}^{5}C_x\right)$ is

[AP EAMCET 24-08-2021_Shift-1]

1. $\{1,2,5\}$
2. $\{2,3,5\}$
3. $\{5\}$
4. $\{1,3,5\}$

34. The number of ways in which 'n' distinct objects can be put into two different boxes is

[AP EAMCET 25-08-2021_Shift-1]

1. ${}^{n}P_2$
2. 2^n
3. ${}^{n}C_2$
4. $n(n-1)(n-2)$

35. A student has to answer 10 out of 13 questions in an examination. The number of ways in which he can answer if he must answer at least 3 of the first five questions is

[AP EAMCET 25-08-2021_Shift-1]

1. 376
2. 276
3. 286
4. 386

36. The number of ways of selecting a committee of 30 persons from 20 boys, 20 girls and 20 teachers such that the participation of number of boys, girls and teachers in that committee s equal, is

[TS EAMCET 04-08-2021_Shift-2]

1. $(20!)(20!)(20!)$
2. ${}^{60}C_{30}$
3. $\dfrac{(20!)^3}{(10!)^6}$
4. $\dfrac{(20!)(20!)}{10!10!}$

37. ${}^{34}C_5 + \sum_{r=0}^{4} {}^{(38-r)}C_4 =$

[TS EAMCET 04-08-2021_Shift-1]

1. ${}^{22\times39}C_4$
2. ${}^{39}C_4$
3. ${}^{3\times39}C_5$
4. ${}^{39}C_5$

38. Three and four numbers are formed from the digits 1, 3, 5, 6, 8. If e_1 is the number of three digit even numbers with no digit repeated and e_2 is number of four digit even numbers with no digit repeated. Also O_1 represent the number of three digit odd numbers in which no digit is repeated and O_2 represent the number of four digit odd numbers in which no digit is repeated. Then **[TS EAMCET 05-08-2021_Shift-1]**

1. $e_1 = O_1, e_2 = O_2$
2. $e_1 + e_2 + O_1 + O_2 = {}^{5}p_3 + 5^3$
3. $\dfrac{e_1+e_2}{2} = \dfrac{O_1+O_2}{3} = 6^2$
4. $\dfrac{e_1+e_2}{O_1+O_2} = \dfrac{3}{2}$

39. If $x = {}^{16}C_5 + {}^{12}C_4, y = \sum_{r=1}^{3} {}^{(20-r)}C_4, z = \sum_{k=1}^{4} {}^{(16-k)}C_3$, then $x+y+z =$

[TS EAMCET 05-08-2021_Shift-2]

1. $19\times17\times45$
2. $19\times17\times15$
3. $19\times17\times16$
4. $19\times17\times48$

40. 15 girls are seated at a round table. The number of ways of selecting three girls such that all the three are not seated together is

[TS EAMCET 06-08-2021_Shift-2]

1. 450
2. 345
3. 390
4. 440

41. How many chords can be drawn through 21 points on a circle?

[AP EAMCET 04-07-2022_Shift-1]

1. 105
2. 210
3. 420
4. 840

42. If a polygon of n sides has 560 diagonals then n = **[AP EAMCET 04-07-2022_Shift-1]**

1. 35
2. 36
3. 37
4. 38

43. A person writes letters to 6 friends and addresses the corresponding envelopes. In how many ways can the letters be placed in the envelopes so that at least two of them are in the wrong envelopes?

$$Notation: D_n = n!\left(\sum_{i=0}^{n}\frac{(-1)^i}{i!}\right)$$

[AP EAMCET 04-07-2022_Shift-1]

1. ${}^6C_4.D_2$
2. $\sum_{r=3}^{6} {}^6C_{6-r}.D_r$
3. $\sum_{r=2}^{6} {}^6C_{6-r}.D_r$
4. ${}^6C_1D_5 + {}^6C_0.D_6$

44. The least value of n so that ${}^{(n-1)}C_3 + {}^{(n-1)}C_4 > {}^nC_3$

[AP EAMCET 04-07-2022_Shift-2]

1. 11
2. 9
3. 8
4. 7

45. A natural number n such that n! ends in exactly 1000 zeros is n!

[AP EAMCET 04-07-2022_Shift-2]

1. 4010
2. 4000
3. 4009
4. 4004

46. If $10\,{}^nC_2 = 3\,{}^{n+1}C_3$, then the value of n is

[AP EAMCET 05-07-2022_Shift-1]

1. 3
2. 10
3. 7
4. 9

47. There are 10 points in a plane, out of these 6 are collinear. If N is the total number of triangles formed by joining these points, then N= **[AP EAMCET 05-07-2022_Shift-1]**

1. 120
2. 850
3. 100
4. 150

48. 205 students take an examination of whom 105 pass in English, 70 students pass in mathematics and 30 students pass in both. How many students fail in both subjects?

[AP EAMCET 05-07-2022_Shift-1]

1. 60
2. 145
3. 175
4. 30

49. In an examination, the maximum marks for each of three subjects is n and that for the fourth subject is 2n. The number of ways in which candidates can get 3n marks is

[AP EAMCET 05-07-2022_Shift-1]

1. $\frac{1}{6}(n+1)^2(5n^2+10n+6)^2$
2. $\frac{1}{6}(n+1)(5n^2+10n+6)^2$
3. $\frac{1}{6}(n+1)^2(5n^2+10n+6)$
4. $\frac{1}{6}(n+1)(5n^2+10n+6)$

50. Given 5 different green toys, 4 different blue toys, and 3 different red toys, how many combinations of toys can be chosen taking at least one green and one blue toy?

[AP EAMCET 05-07-2022_Shift-2]

1. $32\times16\times4$
2. $31\times15\times4$
3. $32\times16\times8$
4. $31\times15\times8$

51. If ${}^{2n}C_3 : {}^nC_3 = 12:1$, then $n =$

[AP EAMCET 05-07-2022_Shift-2]

1. 5
2. 8
3. 10
4. 3

52. There are 4 oranges, 5 apples, 7 mangoes in a fruit basket. The number of ways of selecting at least one fruit from among the fruits in the basket is

[AP EAMCET 05-07-2022_Shift-2]

1. 210
2. 240
3. 209
4. 239

53. If ${}^9C_3 + {}^9C_5 = {}^{10}C_r$ for some $r \in N$, then r =

[AP EAMCET 05-07-2022_Shift-2]

1. 3
2. 4
3. 5
4. 7

54. The value of ${}^{34}C_5+\sum_{i=0}^{4}(38-i)C_4$ is

[AP EAMCET 06-07-2022_Shift-1]

1. ${}^{39}C_4$
2. ${}^{39}C_5$
3. ${}^{38}C_5$
4. ${}^{38}C_4$

55. Let T_n be the number of all possible triangles formed by joining vertices of an n-sided regular polygon. If $T_{n+1}-T_n=10$, then the value of n is **[AP EAMCET 06-07-2022_Shift-2]**

1. 5
2. 3
3. 7
4. 4

56. If $n_{C_{r-1}}=36, n_{C_r}=84$ *and* $n_{C_{r+1}}=126$ *then the value of* nr^2 *is*

[AP EAMCET 07-07-2022_Shift-1]

1. 243
2. 9
3. 27
4. 81

57. The total number of positive integral solutions (x,y,z) of xyz =24 is

[AP EAMCET 07-07-2022_Shift-1]

1. 24
2. 30
3. 36
4. 32

58. Let $P_1, P_2, \ldots\ldots, P_{15}$ *be* 15 *points* on a circle. The number of distinct triangles formed by points P_i, P_j, P_k such that $i+j+k \neq 15$, is

[AP EAMCET 07-07-2022_Shift-1]

1. 449
2. 419
3. 455
4. 443

59. What is the sum of the first n-terms of the series, whose k-term is $k! \times k$?

[AP EAMCET 07-07-2022_Shift-1]

1. $(n+1)!^n-1$
2. $(n+1)^n-1$
3. $(n+1)!-1$
4. $3n-2$

60. In a plane there are 37 straight lines of which 13 pass through point A and 11 pass through the point B. Moreover, no three lines (apart from the lines passing through A and B) pass through same point and no two are parallel. What is the number of points of intersection of the straight lines?

[AP EAMCET 07-07-2022_Shift-2]

1. 37_{C_2}
2. $37_{C_2}-13_{C_2}-11_{C_2}$
3. $37_{C_2}-13_{C_2}-11_{C_2}+2$
4. $37_{C_2}-2$

61. The number of 5 card combinations out of a deck of 52 cards if there is exactly one ace in each combination is

[AP EAMCET 08-07-2022_Shift-1]

1. 823764
2. 363428
3. 778320
4. 542380

62. If ${}^{10}P_r=604800$ *and* ${}^{10}C_r=120$ then r =

[AP EAMCET 08-07-2022_Shift-1]

1. 14
2. 7
3. 8
4. 16

63. A question paper consists of two sections having 3 and 4 questions respectively. The following note is given on the paper "It is not necessary to attempt all the questions. One question from each section is compulsory". In how many ways can a candidate select the questions?

[AP EAMCET 08-07-2022_Shift-1]

1. 105
2. 210
3. 2^7
4. 2^5

64. If ${}^{n-3}C_r+B\,{}^{n-3}C_{r-1}+B^1\,{}^{n-3}C_{r-2}+{}^{n-3}C_{r-3}={}^nC_r$ holds for all $n \geq r \geq 3$, then $(B.B')=$

[AP EAMCET 08-07-2022_Shift-2]

1. (1.5)
2. (5.1)
3. (3.3)
4. (4.2)

65. A student is to answer 10 out of 13 questions in an examination such that he must choose at least 4 from the first five questions. The number of choices available to him is

[AP EAMCET 08-07-2022_Shift-2]

1. 196
2. 140
3. 168
4. 176

66. The number of ways of dividing 200 dissimilar things into 10 groups each containing 20 elements is

[AP EAMCET 08-07-2022_Shift-2]

1. $(200)!/(201)^{20}.10!$
2. $(200)!/(10!)^{10}.20!$
3. $(200)!/(20!)^{10}.10!$
4. $(200)!/(10!)^{20}.20!$

67. In how many different ways can three persons A, B, C having 6,7 and 8 one-rupee coins respectively, donate Rs.10 collectively?

[AP EAMCET 08-07-2022_Shift-2]

1. 47
2. 66
3. 56
4. 60

68. Match the item of List – I to the items of List – II

	List – I		List – II
(A)	The number of ways of not selecting (n-r) things from n different things	(I)	$1+n+{}^nC_2+....+{}^nC$
(B)	$(n-r+1).{}^nC_{r-1}$	(II)	$(r+1).{}^nC_{r+1}$
(C)	The number of ways of selecting atleast (n-r) things from n different things	(III)	$r.{}^nC_r$
(D)	$(n-r)\left({}^{(n-1)}C_{r-1}+{}^{(n-1)}C_r\right)$	(IV)	$2^n-1-n-{}^nC_2-....-{}^nC$
		(V)	${}^nC_{n-r}$

The correct match is :

	A	B	C	D
1.	V	III	IV	II
2.	I	II	IV	III
3.	V	III	I	II
4.	I	V	IV	III

[TS EAMCET 18-07-2022_Shift-1]

69. The exponent of 6 in 72! Is

[TS EAMCET 18-07-2022_Shift-2]

1. 34
2. 70
3. 17
4. 35

70. Let N be the set of positive integers. The number of distinct triplets (x, y, z) satisfying $x, y, z \in \mathbb{N}, x < y < z$ and $x+y+z=12$ is

[TS EAMCET 19-07-2022_Shift-I]

1. 5
2. 7
3. 6
4. 8

71. A question paper has 3 parts and each part contains 4 questions. The number of different ways in which a candidate can answer 8 questions choosing at least two from each part is **[TS EAMCET 19-07-2022_Shift-I]**

1. 396
2. 204
3. 224
4. 132

72. 15 lines are concurrent at a point P. A line L not passing through P intersects all the 15 lines and forms triangles with them. Then the number of triangles having L as one of its side is **[TS EAMCET 19-07-2022_Shift-2]**

1. 310
2. 91
3. 182
4. 105

73. The total number of ways of selecting 4 letters from all the letters of the word TSEAMCET is

[TS EAMCET 20-07-2022_Shift-2]

1. 12
2. 13
3. 26
4. 36

74 If the number of diagonals of a regular polygon of n sides is 104, then n =

[15th May 2023 Shift 1]

1. 19
2. 16
3. 13
4. 11

75 A team of 5 students is to be selected from 12 students. If two particular students are to be included in that team, then the number of ways that such team can be selected is

[15th May 2023 Shift 1]

1. 792
2. 180
3. 120
4. 90

76 The number of non-negative integral solutions of $x_1+x_2+x_3+x_4=10$ is

[15th May 2023 Shift 2]

1. 120
2. 144
3. 256
4. 286

77 The least value of n such that ${}^{(n-1)}C_6 + {}^{(n-1)}C_7 < {}^{n}C_8$ is
[16th May 2023 Shift 1]
1. 14 2. 15
3. 16 4. 17

78. The greatest integer r such that 30^r divides 30! Is
[16th May 2023 Shift 2]
1. 8 2. 7
3. 6 4. 5

79. The number of elements in the set $\{x \in N: \quad x \in N : {}^{20-2x} c_{x-3} \in N\}$ is
[16th May 2023 Shift 2]
1. 3 2. 4
3. 5 4. 6

80. The number of all 8 digit odd numbers is
[17th May 2023 Shift 1]
1. 45×10^6 2. 90×10^6
3. 9×10^8 4. 9×10^6

81 If $f(n)=n!(31-n)!$, where $n\in\{0,1,2,....31\}$, then the minimum value of f(n)is
[17th May 2023 Shift 1]
1. $(15!)(15!)$ 2. $(15!)(14!)$
3. $(14!)(16!)$ 4. $(15!)(16!)$

82 The number of odd positive divisors of 67500 is
[18th May2023 shift -1]
1. 16 2. 18
3. 20 4. 22

83. The least value of n for which ${}^{(n-1)}C_2 + {}^{(n-1)}C_3 > {}^{n}C_2$ *is*
[18th May2023 shift -1]
1. 7 2. 4
3. 5 4. 6

84. ${}^{2n}C_4 : {}^{n}C_3 = 99:4 \Rightarrow n =$
[18th May2023 shift -1]
1. 7 2. `6
3. 8 4. 5

85. If
$N(n)=n\prod_{r=1}^{2023}(n^2-r^2)(n>2023)$, *then* ${}^{N}C_{N-1}$ *when* $n=2024$ *is*
[19th May 2023 Shift 1]
1. $(4047)!$ 2. $(4048)!$
3. $(6023)!$ 4. $(6029)!$

86 A student is allowed to select at most n books from a collection of (2n+1) books. If the total number of ways in which he can select at least one book is 255, then the value of n is
[12TH MAY 2023 SHIFT -2]
1. 4 2. 5
3. 6 4. 7

87. If ${}^{n}C_r$ denotes the number of combinations of n distinct things taken r at a time, then the domain of the function $g(x)={}^{(16-x)}C_{(2x-1)}$ is
[EAPCET 14-05-23 SHIFT-1]
1. $\{1,2,3,4,5\}$ 2. $\{0,1,2,3,4\}$
3. ϕ 4. $\{0\}$

88 The number of diagonals of a polygon is 35. If A,B are two distinct vertices of this polygon, then the number of all those triangles formed by joining three vertices of the polygon having AB as one of its sides is
[EAPCET 14-05-23 SHIFT-1]
1. 1 2. 8
3. 10 4. 12

89. There are 10 points in a plane, of which no three points are collinear except 4. Then, the number of distinct triangles that can be formed by joining any three points of these ten points such that at least one of the vertices of every triangle formed is from the given 4 collinear points is **[EAPCET 14-05-23 SHIFT-1]**
1. 80 2. 100
3. 96 4. 116

90 A student is asked to answer 10 out of 13 questions in an examination such that he must answer atleast four question from the first five questions. Then the total number of possible choices available to him is
[EAPCET 14-05-23 SHIFT-1]
1. 186 2. 176
3. 286 4. 196

91 The total number of ways of forming a committee of 5 members out of 7 Indians, 6 Americans, 5 Russians and 4 Australians so that every committee contains at least one member from each country is
[EAPCET 13-05-23 SHIFT-2]
1. 3360 2. 6720
3. 7200 4. 7560

KEY

1)	1	2)	4	3)	3	4)	1	5)	1
6)	2	7)	3	8)	2	9)	3	10)	3
11)	4	12)	4	13)	2	14)	3	15)	1
16)	3	17)	3	18)	3	19)	2	20)	2
21)	1	22)	1	23)	2	24)	2	25)	2
26)	2	27)	4	28)	3	29)	2	30)	3
31)	1	32)	2	33)	3	34)	2	35)	2
36)	3	37)	4	38)	3	39)	4	40)	4
41)	2	42)	1	43)	3	44)	3	45)	3
46)	4	47)	3	48)	1	49)	4	50)	4
51)	1	52)	4	53)	2	54)	2	55)	1
56)	4	57)	2	58)	4	59)	3	60)	3
61)	3	62)	2	63)	1	64)	3	65)	1
66)	3	67)	1	68)	3	69)	1	70)	2
71)	1	72)	4	73)	4	74)	2	75)	3
76)	4	77)	3	78)	2	79)	3	80)	1
81)	4	82)	3	83)	4	84)	2	85)	1
86)	1	87)	1	88)	4	89)	1	90)	4
91)	4								

SOLUTIONS

1. No of selections =

$2n+1_{C_1}+2n+1_{C_2}+\ldots\ldots+2n+1_{C_n}$

$=\dfrac{2^{2n+1}}{2}-1=2^{2n}-1$

Given $2^{2n}-1=255$

$4^n=4^4$

n = 4

2. $n=(210)^2(360)(143)=2^5.3^4.5^3.7^2.11.13$

total no of divisors = 6x5x4x3x2x2 = 1440

no of nontrivial solutions = 1440 - 2 = 1438

3. No.of rectangles in chess board $={}^{(n+1)}C_2\times{}^{(n+1)}C_2$

No.of squares in chess board $=\sum n^2$

Given no.of rectangles but not no.of squares = 350

$\Rightarrow{}^{(n+1)}C_2\times{}^{(n+1)}C_2-\sum n^2=350$

$\Rightarrow\dfrac{(n+1)n}{2}\times\dfrac{(n+1)n}{2}-\dfrac{n(n+1)(2n+1)}{6}=350$

By verify n = 6

Total no, of square $=6\times6=36$

No. of white squares =18

4. Total number of matches played by them is 30_{C_2}

5. Let n be the number of sides in a polygon

Number of diagonals $=\dfrac{n(n-3)}{2}=54\Rightarrow n=12$

6. Stroke side $\rightarrow 3,1\rightarrow 4!$

Non stroke side $\rightarrow 4\rightarrow 4!$

Select 4 persons from 9 persons for non-stroke side in $9_{C_4}\times4!$ *ways*

Select 4 persons from remaining 8 persons for stroke side in $8_{C_4}\times4!$ *ways*

No of ways = $9_{C_4}\times4!\times8_{C_4}\times4!$ *ways*

7. In a chess-board,

No. of vertical lines = 9

No. of horizontal lines = 9

To form a rectangle, we need 2 vertical and 2 horizontal lines.

$\therefore$ required number of rectangles $={}^9C_2\times{}^9C_2$

8. $= {}^{n}C_{r+1} + {}^{n}C_{r} + {}^{n}C_{r} + {}^{n}C_{r-1}$

$= {}^{n+1}C_{r+1} + {}^{n+1}C_{r} = {}^{n+2}C_{r+1}$

9. Sum of squares in a chess board $= \sum n^2$

$= \frac{n(n+1)(2n+1)}{6}$

Take n = 8 and calculate, we get

$\frac{(8)(9)(17)}{6} = 204$

10. Given total members 10 and required 6 members.

One particular member always including. i.e., 5 members selected from required '9' members is 9_{C_5}

11. *Given* $n_{C_7} = n_{C_6} \Rightarrow n = 7 + 6 = 13$

$13_{C_2} = \frac{13\times12}{1\times2} = 78$

12. ${}^{12}C_{2k-1} = {}^{12}C_{k+1}$

${}^{n}c_{r} = {}^{n}c_{s} \Rightarrow n = r + s \text{ or } r = s$

$12 = 2k - 1 + k + 1, 2k - 1 = k + 1 \Rightarrow k = 4, k = 2$

3. Req. polygon

$\frac{n(n-3)}{2} = 170$

$n^2 - 3n - 340 = 0 \Rightarrow n = 20$

sum of the interior angles of the polygon $= (n-2)180^0$

measure of interior angle $= \frac{(n-2)180^0}{n} = \frac{18(\pi)}{20} = \frac{9\pi}{20}$

14. ${}^{4}C_2 \times {}^{6}C_4 + {}^{4}C_3 \times {}^{6}C_6 = 94$

15. Required permutation $= {}^{5}C_3 \times {}^{5}C_2 \times 5! = 12000$

16. ${}^{n}C_2 = 15$

$n(n-1) = 6\times5 \Rightarrow n = 6$

17. Verify

18. No. of convex polygons

$= {}^{10}C_3 + {}^{10}C_4 + ... + {}^{10}C_{10}$

$= 2^{10} - \left({}^{10}C_0 + {}^{10}C_1 + {}^{10}C_2\right) = 968$

19. $X = \{(a,b) / a,b \in z,\ 0 \le a \le 20,\ 0 \le b \le 15\}$

No. of rectangles $= {}^{21}C_2 \times {}^{16}C_2 = 25200$

20. $1 + (1+x) + ... + (1+x)^n$

This is in G.P

$\frac{\left[(1+x)^n - 1\right]}{1 + x - 1} = \frac{(1+x)^{n+1} - 1}{x}$

co-efficient of $x^{100} = {}^{n+1}C_{101}$

$\therefore n = 200$

21. $x = (3+1)(4+1)(5+1) - 1 = 119$

$y = 2^5 - 1 = 31 \Rightarrow x + y = 119 + 31 = 150$

22. The number of ways in which voter may vote

$= {}^{12}C_1 + {}^{12}C_2 + {}^{12}C_3 + {}^{12}C_4 = {}^{13}C_2 + {}^{13}C_4 = 793$

23. Given $x + y + z + w = 25$ And $x, y, z \ge -1, w \ge 1$

Now,

$(x+1) + (y+1) + (z+1) + (w-1) = 25 + 1 + 1 + 1 - 1$

Let $x + 1 = x_1, y + 1 = x_2, z + 1 = x_3, w - 1 = x_4$

$\Rightarrow x_1 + x_2 + x_3 + x_4 = 27$

$x_1 \ge 0, x_2 \ge 0, x_3 \ge 0, x_4 \ge 0$

$n = 27, r = 4$

No. of integral solutions $= {}^{n+r-1}C_{r-1} = {}^{30}C_3$

24. I : ${}^{n-1}C_{r-1} = {}^{9}C_3 = 84$

II: $25! = 10^n \times k$

$n = \left[\frac{25}{5}\right] + \left[\frac{25}{5^2}\right] = 5 + 1 = 6$

25. $2^{2n} - 1 = 255 \Rightarrow 4^n = 4^4 \Rightarrow n = 4$

No. of books $= 2n + 1 = 9$

26. Total elements = 12

The no. of subsets of the set contains at most 5

elements $= {}^{12}C_1 + {}^{12}C_3 + {}^{12}C_5$

27. Total no. of parallelogram $= 675$

${}^{m}C_2 . {}^{10}C_2 = 675 \Rightarrow m(m-1) = 30 \Rightarrow m = 6$

28. $\sum_{r=0}^{4} {}^{19-r}C_3 + {}^{15}C_4 = {}^{19}C_3 + {}^{18}C_3 + {}^{17}C_3 + {}^{16}C_3 + {}^{15}C_4 + {}^{15}C_3$

Use ${}^{n}C_r + {}^{n}C_{r-1} = {}^{n+1}C_r = {}^{20}C_4$

29. Integers : 1,2,3,......,1000

No. of integers divisible by 2

$= \left[\frac{1000}{2}\right] = 500 = n(A)$

No. of integers divisible by 3

$= \left[\frac{1000}{3}\right] = 333 = n(B)$

No. of integers divisible by 6

$= \left[\frac{1000}{6}\right] = 166 = n(A \cap B)$

$\therefore n(A \cup B) = n(A) + n(B) - n(A \cap B) = 467$

30. No. of triangles $= {}^{10}C_1 . {}^{8}C_2 + {}^{10}C_2 . {}^{8}C_1 = 640$

31. No. of ways of choosing r – objects from n – objects $(r < n)$ is ${}^{n}C_r$

$\therefore$ Conceptual no. of ways of distributing balls into 4 objects $= {}^{n+r-1}C_{r-1} = {}^{9}C_3$

32. No. of integers divisible by 2 and 3 = no. of integers divisible by 6

$\therefore$ Sum of the those integers $= 6 + 12 + ... + 48$

$= 6(1 + 2 + ... + 8) = 6 \times \frac{8 \times 9}{2} == 216$

33. ${}^{5}C_{x-1} > 2.{}^{5}C_x$

Domain: $x - 1 > 0 \,\&\, 5 \geq x - 1; x > 0 \,\&\, x \leq 5$

$\Rightarrow x > 1 \,\&\, x \leq 5$; $x > 0 \,\&\, x \leq 5$

$\therefore$ Domain $x = \{1,2,3,4,5\}$

$\Rightarrow 1 > 2.\frac{{}^{5}C_x}{{}^{5}C_{x-1}} \Rightarrow 1 > 2.\left(\frac{5 - x + 1}{x}\right)$

$\Rightarrow x > 12 - 2x \Rightarrow 3x > 12 \Rightarrow x > 4$

$\therefore x = \{5\}$ only.

34. Every object has 2 changes

$\therefore$ Total no. of possibilities $= 2.2...(\text{n times}) = 2^n$

35.

1^{st} 5Q	Remaining 8Q
3	7
4	6
5	5

$\therefore$ Total possibilities

$= {}^{5}C_3 . {}^{8}C_7 + {}^{5}C_4 . {}^{8}C_6 + {}^{5}C_5 . {}^{8}C_5 = 276$

36. ${}^{20}C_3 \cdot {}^{20}C_3 \cdot {}^{20}C_3 = \left(\frac{(20)!}{(10)!(10)!}\right)^3 = \frac{((20!))^3}{((10!))^6}$

37. ${}^{34}C_5 + \sum_{r=0}^{4} {}^{(38-r)}C_4 = {}^{34}C_5 + {}^{38}C_4 + {}^{37}C_4 + {}^{36}C_4 + {}^{35}C_4 + {}^{34}C_4$

$\left[{}^{n}C_r + {}^{n}C_{r-1} = {}^{n+1}C_r\right] = {}^{39}C_5$

38. Given digits, 1,3,5,6,8

(i) No. of 3-digit even numbers,

$\underbrace{\_\;\_}_{^4P_2}\;\underbrace{\overset{6,8}{\boxed{\;\;}}}_{2}$

$= 4 \times 3 \times 2 = 24 \Rightarrow e_1 = 24$

(ii) No. of 4-digit even numbers,

$\underbrace{\_\;\_\;\_}_{^4P_3}\;\underbrace{\overset{6,8}{\boxed{\;\;}}}_{2}$

$= 4 \times 3 \times 2 \times 2 = 48 \Rightarrow e_2 = 48$

(iii) No. of 3-digit odd numbers,

$\underbrace{\_\;\_}_{^4P_2}\;\underbrace{\overset{1,3,5}{\boxed{\;\;}}}_{3}$

$= 4 \times 3 \times 3 = 36 \Rightarrow O_1 = 36$

(iv) No. of 4-digit odd numbers,

$\underbrace{\_\;\_\;\_}_{^4P_3}\;\underbrace{\overset{1,3,5}{\boxed{\;\;}}}_{3}$

$= 4 \times 3 \times 2 \times 3 = 72 \Rightarrow O_2 = 72$

By verifying option(3), $\frac{e_1 + e_2}{2} = \frac{O_1 + O_2}{3}$

39. ${}^{n}C_r + {}^{n}C_{r-1} = {}^{n+1}C_r$

On simplification we get ${}^{20}C_5$

$= \frac{20 \times 19 \times 18 \times 17 \times 16}{120} = 19 \times 17 \times 48$

40. Diagram, Required selections

= Total selections – 3 Girls seated together

$= {}^{15}C_3 - 15 = 440$

41. $21_{C_2} = 210$

42. $\frac{n(n-3)}{2} = 560$

n = 35

43. $6_{P_2}\left[1-\frac{1}{1!}+\frac{1}{2!}-\frac{1}{3!}+...+\frac{1}{6!}\right]+6_{P_3}\left[1-\frac{1}{1!}+\frac{1}{2!}....+\frac{1}{6!}\right]$

$+....+6p_6\left[1-\frac{1}{1!}+\frac{1}{2!}.........+\frac{1}{6!}\right]$

$=\sum_{r=2}^{6}6p_r\left[1-\frac{1}{1!}+\frac{1}{2!}-\frac{1}{3!}+......+\frac{1}{6!}\right]$

$=\sum_{r=2}^{6}{}^6C_{6-2}D_r$

44. $n-1_{C_3}+n-1_{C_4}>n_{C_3}$

$n_{C_4}>n_{C_3}$

$n>7$

$n=8$

45. By verification

$\left[\frac{4009}{5}\right]+\left[\frac{4009}{5^2}\right]+\left[\frac{4009}{5^3}\right]+\left[\frac{4009}{5^4}\right]+\left[\frac{4009}{5^5}\right]$

$=801+160+32+6+1$

46. $10\frac{n(n-1)}{2}=3\frac{(n+1)n(n-1)}{6}$

$\therefore n=9$

47. $10_{C_3}-6_{C_3}$

$=100$

8. $n(E)=105$

$n(M)=70$

$n(E\cap M)=30$

$n(E\cup M)=n(E)+n(M)-n(E\cap M)$

$=145$

$n(s)-n(E\cup M)=205-145=60$

49. $x_1+x_2+x_3+x_4=3n, 0\le x_1,x_2,x_3\le n, o\le x_4\le 2n$

Co. eff of

$x^{3n}in\left(1+x+x^2+.....+x^n\right)^3\left(1+x+x^2+....+x^{2n}\right)$

$=\text{cooff } x^{3n}in\left(\frac{1-x^{n+1}}{1-x}\right)^3\left(\frac{1-x^{2n+1}}{1-x}\right)$

$=\frac{1}{6}(n+1)\left(5n^2+10n+6\right)$

50. $\left(2^5-1\right)\left(2^4-1\right)2^3$

$=31\times15\times8$

51. $2n_{C_3}:n_{C_3}=12:1$

$\frac{2n(2n-1)(2n-2)}{n(n-1)(n-2)}=12$

$n=5$

52. $(4+1)(5+1)(7+1)-1$

$=240-1$

$=239$

53. $9_{C_3}+9_{C_5}=10_{Cr}$

$9_{C_5}+9_{C_6}=10_{C_r}$

$10_{C_6}=10_{Cr}$

$=>r=4\ or\ 6$

54. $34_{C_5}+\sum_{i=0}^{4}(38-i)_{C_4}$

$=34_{C_5}+38_{C_4}+37_{C_4}+36_{C_4}+35_{C_4}+34_{C_4}$

$=35_{C_5}+35_{C_4}+36_{C_4}+37_{C_4}+38_{C_4}$

$=36_{C_5}+36_{C_4}+37_{C_4}+38_{C_4}$

$=37_{C_5}+37_{C_4}+38_{C_4}$

$=38_{C_5}+38_{C_4}=39_{C_5}$

55. $n+1_{C_3}-n_{C_3}=10$

$n_{C_2}+n_{C_3}-n_{C_2}=10$

$n_{C_2}=10$

$n=5$

56. $n_{C_{r-1}}=36, n_{C_r}=84, n_{C_{r+1}}=126$

$\frac{n_{Cr}}{n_{Cr-1}}=\frac{84}{36}$

$\frac{n-r+1}{r}=\frac{7}{3}$

$3n+3=10r\rightarrow(1)$

$\frac{n_{C_{r+1}}}{n_{Cr}}=\frac{126}{84}$

$\frac{n-r}{r+1}=\frac{3}{2}$

$2n-3=5r\rightarrow(2)$

From (1) and (2)

n = 9

r = 3

$nr^2=81$

57. $xyz = 24$

$1.1.24 = \frac{3!}{2} = 3$

$1.2.12 = 3! = 6$

$2.3.4 = 3! = 6$

$1.6.4 = 3! = 6$

$2.2.6 = \frac{3!}{2!} = 3$

$1.3.8 = 3! = 6$

$\underline{\overline{\quad 30 \quad}}$

58. Total triangles $= 15_{C_3} = 455$

$P_i \; P_j \; P_k$

$\left.\begin{matrix} 1 & 2 & 12 \\ & 3 & 11 \\ & 4 & 10 \\ & 5 & 9 \\ & 6 & 8 \end{matrix}\right\} 5$

$\left.\begin{matrix} 2 & 3 & 10 \\ & 4 & 9 \\ & 5 & 8 \\ & 6 & 7 \end{matrix}\right\} 4$

$\left.\begin{matrix} 3 & 4 & 8 \\ & 5 & 7 \end{matrix}\right\} 2$

$4 \; 5 \; 6 \} 1$

Cases to not be considers

$= 5 + 4 + 2 + 1 = 12$

$\therefore$ possible triangles $= 455 - 12 = 443$

59. $1! + 2.2! + ... + n.n!$

$= (2-1)1! + (3-1)2! + ... + (n+1-1)n!$

$= 2! - 1! + 3! - 2! + ... + (n+1! - n!)$

$= (n+1)! - 1!$

60. $37_{C_2} - 13_{C_2} - 11_{C_2} + 2$

61. $4_{C_1} \times 48_{C_2}$

$= 778320$

62. $\frac{n_{P_r}}{n_{C_r}} = r!$

$\frac{60\,4800}{120} = 5040 = 7!; r = 7$

63. $3_{C_1}4_{C_1} + 3_{C_1}4_{C_2} + 3_{C_1}4_{C_3} + 3_{C_1}4_{C_4}$

$+3_{C_2}4_{C_1} + 3_{C_2}4_{C_2} + 3_{C_2}4_{C_3} + 3_{C_2}4_{C_4}$

$+3_{C_3}4_{C_1} + 3_{C_3}4_{C_2} + 3_{C_3}4_{C_3} + 3_{C_3}4_{C_4}$

$= 105$

64. $n-3_{C_r} + 3.n-3_{C_{r-1}} + 3.n-3_{C_{r-2}} + n-3_{C_{r-3}}$

$= \left(n-3_{C_r} + n-3_{C_{r-1}}\right) + 2\left(n-3_{C_{r-1}} + n-3_{C_{r-2}}\right)$

$+\left(n-3_{C_{r-2}} + n-3_{C_{r-3}}\right)$

$= n-2_{C_r} + 2.n-2_{C_{r-1}} + n-2_{C_{r-2}}$

$= n-1_{C_r} + n-1_{C_{r-1}} = n_{C_r}$

65.

Group (A)	Group(B)	No of ways
4	6	$5_{C_4} \times 8_{C_6}$
5	5	$5_{C_5} \times 8_{C_5}$

Req. no of ways $= 5_{C_4}8_{C_6} + 5_{C_5}8_{C_5} = 196$

66. $\frac{(200)!}{(20!)^{10}}10!$

67. $0 \le x \le 6, 0 \le x \le 7, 0 \le x \le 8$

$x_1 + x_2 + x_3 = 10$

No of ways =co.eff of x^{10} in

$\left(1 + x + x^2 + ... + x^6\right)\left(1 + x + x^2 + ... + x^7\right)$

$\left(1 + x + x^2 + ... + x^8\right)$

$=$ Coefficient of x^{10} in $\frac{1-x^7}{1-x}\frac{1-x^8}{1-x}\frac{1-x^9}{1-x}$

$= Coefficient \; of x^{10} \; in \left(1 - x^7 - x^8 - x^9 ....\right)\left(1 + 3_{C_1}x + 4_{C_2}x^2 + ...\right)$

$= 12_{C_{10}} - 5_{C_3} - 4_{C_2} - 3_{C_1}$

68. Expensed of 3 in 72!

$= \left[\frac{72}{3}\right] + \left[\frac{72}{3^2}\right] + \left[\frac{72}{3^3}\right] + ...$

$= 24 + 8 + 2$

$= 34$

69 (1,2,9) ,(1,3,8), (1,4,7),(1,5,6), (2,3,7),(2,4,6)
(3,4,5)

70

A	B	C
2	2	4
2	3	3

The number of ways

$=3\left(4_{C_2}4_{C_2}4_{C_4}\right)+3\left(4_{C_2}4_{C_3}4_{C_3}\right)$

$=108+288$

$=396$

71. A) $n_{C_{r-1}}$

B) $(n-r+1)\,n_{C_{r-1}}=r\,n_{C_r}$

C) $1+n_{C_1}+n_{C_2}+.....+n_{Cr}$

D) $(n-r)\left(n-1_{C_{r-1}}+n-1_{C_r}\right)=(r+1)n_{C_{r+1}}$

72. $\dfrac{n(n-1)}{2}$

$\dfrac{15.14}{2}=105$

73. TT.EE,S,A,M,C

All different = 6_{C_4}

2 alike , 2alike = 2_{C_2}

2 alike,2 different = $2_{C_1}\times 5_{C_2}$

total number of ways ...

$=6_{C_4}+2_{C_2}+2_{C_1}5_{C_2}$

$=15+1+20$

$=36$

74 $\dfrac{n(n-3)}{2}=104$

$n(n-3)=208$

$n(n-3)=16\times 13$

$\boxed{n=16}$

75 $^{10}C_3=\dfrac{10\times \cancel{9}^{3}\times \cancel{8}^{4}}{1\times \cancel{2}\times \cancel{3}}=120$

76 No. of non – negative integral solution of

$x_1+x_2+x_3+x_4=10$ is

$\boxed{n=10, r=4}$ $\quad ^{(n+r-1)}C_{r-1}$

$={}^{13}C_3$

$=286$

77 $^{n-1}C_6+{}^{n-1}C_7<{}^{n}C_8$

$^{n}C_7<{}^{n}C_8$

$1<\dfrac{^{n}C_8}{^{n}C_7}$

$1<\dfrac{n-7}{8}$

$8<\mathrm{n}-7$

$\mathrm{n}>15$

78 30! $\quad$ 30=3x2x5

No of 5's = $\left[\dfrac{30}{5}\right]+\left[\dfrac{30}{5^2}\right]+\left[\dfrac{30}{5^3}\right]+.......$

= 6+1+0

= 7

$\therefore$ 30! is divisible by 30^7

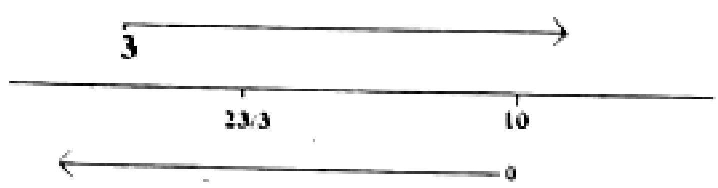
$\therefore r=7$

79 $\quad 20-2x$

C_{x-3}

$20-2x>0,\ x-3\geq 0,\ 20-2x\geq x-3$

$x<10$, $\quad x\geq 3$, $\quad 3x\ \leq\ 23$



$x\in N$

x=3 ,4,5,6,7

no of x=5

80 $0,1,2,3,4,5,6,7,8,9$

9ways

$\frac{1,3,5,7,9}{5 \text{ ways}}$

First place can be filled with 9 ways unit place can be filled with 5 odd numbers in 5 ways. And remaining 6 places can be filled with 10 digits when repitation is allowed in 10^6 ways

$$=9\times5\times10^6$$

$\therefore$ Req value $=45\times10^6$

81 $f(n)=n!(31-n)!$

$n\in\{0,1,2,.....,31\}$

By verification only one option satisfies the relation minimum value $=(16)!(15)!$

82 $67500=2^2+3^3+5^4$

If $N=2^{\alpha_1}.3^{\alpha_2}.5^{\alpha_3}.........$

Then the odd positive divisors of

$N=(\alpha_2+1)(\alpha_3+1)........$

$\therefore$ odd positive divisors of 67500

$=(\alpha_2+1)(\alpha_3+1)$

$=(3+1)(4+1)=20$

83 By option verification

n=6, n=7 satisfies given in equation

$\therefore$ least value of n=6

84 By option verification n-6 satisfies given equation

$\therefore$ n=6

85. $n.(n^2-1)(n^2-2^2).....(n^2-2023^2)$

$=n(n+1)(n+2)......(n+2023)(n-1)(n-2)......(n-2023)$

$=\frac{(1.2.3.......n-2022)n(n-1)(n-2).......(n+1).......(n+2023)}{(n-2022)!}$

$$=\frac{(n+2023)!}{(n-2022)!}\times\frac{4045!}{4045!}$$

$$={}^{n+2023}C_{4045}\times(4045)!$$

$$={}^{2024+2023}C_{4045}\times(4045)!$$

$$={}^{4047}C_2\times(4045)!$$

$$=(4047)!$$

86 ${}^{2n+1}C_1+{}^{2n+1}C_2+---+{}^{2n+1}C_n=2^{2n}-1=255$

$2^{2n}=256$

$\boxed{n=4}$

87 $16-x>0$

$x<16$

$2x-1\geq0$

$x\geq\frac{1}{2}$ $\quad a,b,c,d\in A$

Domain $=\{1,2,3,4,5\}$

88. No of diagonals =35

$\frac{n(n-3)}{2}=35$

n =10

A, B are 2 distinct vertices

Then required triangles are 8

89 10- points

4 – collinear

6 - non- collinear

Required triangles $=(4_{C_1}\times6_{C_2})+(4_{C_2}\times6_{C_1})$

$=(4\times15)+(6\times6)$

=60+36

=96

90 Table -13 Questions

5 Question	8 Question	ways
4	6	$5_{C_4}+8_{C_6}=140$
5	5	$5_{C_5}\times8_{C_5}=56$
		Total =196

91

7(I)	6(USA)	5(R)	4(AUS)
1	1	1	2
1	1	2	1
1	2	1	1
2	1	1	1

The no.of ways $=7\times6\times5\times4c_2+7\times6\times4\times5c_2$

$+7\times5\times4\times6c_2+6\times5\times4\times7c_2$

= 7560