

# QUANTITATIVE APTITUDE

## Permutation and Combination





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1. How many 3 digit number can be formed with the digits 5, 6, 2, 3, 7 and 9 which are divisible by 5 and none of its digit is repeated?

- A. 12
- B. 16
- C. 20
- D. 24
- E. None of these

Answer: C

Explanation: \_\_ \_ 5 first two places can be filled in 5 and 4 ways respectively so, total number of 3 digit number =  $5 \times 4 \times 1 = 20$

2. In how many different ways can the letter of the word ELEPHANT be arranged so that vowels always occur together?

- A. 2060
- B. 2160
- C. 2260
- D. 2360
- E. None of these

Answer: B

Explanation: Vowels = E, E and A. They can be arranged in  $3! / 2!$  Ways

So total ways =  $6! \times (3! / 2!) = 2160$

3. There are 4 bananas, 7 apples and 6 mangoes in a fruit basket. In how many ways can a person make a selection of fruits from the basket?

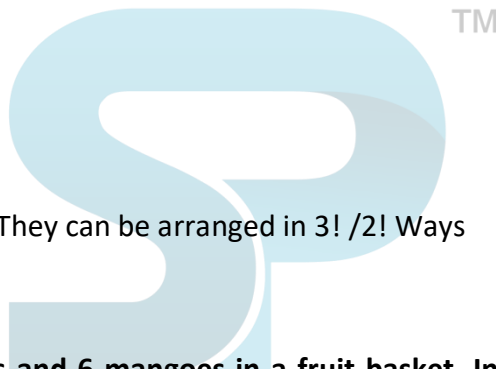
- A. 269
- B. 280
- C. 279
- D. 256
- E. None of these

Answer: C

Explanation:

Zero or more bananas can be selected in  $4 + 1 = 5$  ways (0 orange, 1 orange, 2 orange, 3 orange and 4 orange) similarly apples can be selected in  $7 + 1 = 8$  ways and mangoes in  $6 + 1 = 7$  ways

So total number of ways =  $5 \times 8 \times 7 = 280$  but we included a case of 0 orange, 0 apple and 0 mangoes, so we have to subtract this, so  $280 - 1 = 279$  ways





4. There are 15 points in a plane out of which 6 are collinear. Find the number of lines that can be formed from 15 points.

- A. 105
- B. 90
- C. 91
- D. 95
- E. None of these

Answer: C

Explanation:

From 15 points number of lines formed =  ${}^{15}C_2$

6 points are collinear, number of lines formed by these =  ${}^6C_2$

So total lines =  ${}^{15}C_2 - {}^6C_2 + 1 = 91$

5. In how many ways 4 Indians, 5 Africans and 7 Japanese be seated in a row so that all person of same nationality sits together

- A.  $4! 5! 7! 3!$
- B.  $4! 5! 7! 5!$
- C.  $4! 6! 7! 3!$
- D. can't be determined
- E. None of these



Answer: A

Explanation:

4 Indians can be seated together in  $4!$  Ways, similarly for Africans and Japanese in  $5!$  And  $7!$  Respectively. So total ways =  $4! 5! 7! 3!$

6. In how many ways can 3 prizes be given away to 12 students when each student is eligible for all the prizes?

- A. 1234
- B. 1728
- C. 5314
- D. 1331
- E. None of these

Answer: B.

Explanation:



$$12^3 = 1728$$

7. Total no of ways in which 30 sweets can be distributed among 6 persons?

- A.  $35C_5$
- B.  $35C_5$
- C.  $36C_6$
- D.  $35!/5!$
- E. None of these

Answer: A.

Explanation:

$$30+6-1 C 6-1 = 35C_5$$

8. A bag contains 4 red balls and 5 black balls. In how many ways can i make a selection so as to take at least 1 red ball and 1 black ball?

- A. 564
- B. 345
- C. 465
- D. 240
- E. None of these

Answer: C

Explanation:

$$2^4 - 1 = 16 - 1 = 15$$

$$2^5 - 1 = 32 - 1 = 31$$

$$15 * 31 = 465$$



9. In how many ways can 7 beads be strung into necklace?

- A. 2520
- B. 5040
- C. 720
- D. 360
- E. None of these

Answer: D

Explanation:

$$\text{No of way in Necklace} = (n-1)! / 2 = 6! / 2$$

$$= 720/2 = 360$$



10. Find the no of 3 digit numbers such that at least one of the digit is 6 (with repetitions)?

- A. 252
- B. 345
- C. 648
- D. 560
- E. None of these

Answer: A

Explanation:

Total no of 3 digit number =  $9 \times 10 \times 10 = 900$

No of 3 digit number- none of the digit is 6 =  $8 \times 9 \times 9 = 648$

No of 3 digit number – at least one digit is 6 =  $900 - 648 = 252$

11. In how many ways can 7 girls and 4 boys stand in a row so that no 2 boys are together?

- A. 8467200
- B. 9062700
- C. 7407000
- D. 8407200
- E. None of these



Answer: A

Explanation:

No of ways =  $7! \times 8P_4$

$7! = 5040$

$8P_4 = 8 \times 7 \times 6 \times 5 = 1680$

No of ways =  $5040 \times 1680 = 8467200$

12. In how many ways the letters of the word PERMUTATION be arranged?

- A.  $10! / 2!$
- B.  $10!$
- C.  $11!$
- D.  $11! / 2!$
- E. None of these

Answer: D

Explanation:



No of ways =  $11! / 2!$

**13. How many numbers can be formed with the digits 1, 7, 2, 5 without repetition?**

- A. 89
- B. 56
- C. 64
- D. 72
- E. None of these

**Answer:** C

**Explanation:**

1 digit number = 4

2 digit no =  $4 \times 3 = 12$

3 digit no =  $4 \times 3 \times 2 = 24$

4 digit no =  $4 \times 3 \times 2 \times 1 = 24$

Total =  $4 + 12 + 24 + 24 = 64$

**14. There are 3 boxes and 6 balls. In how many ways these balls can be distributed if all the balls and all the boxes are different?**

- A. 243
- B. 512
- C. 729
- D. 416
- E. None of these

**Answer:** C

**Explanation:**

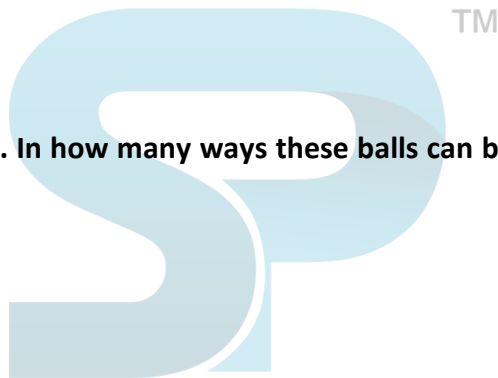
$3^6 = 729$

**15. In how many ways can 4 books be selected out of 10 books on different subjects?**

- A. 210
- B. 320
- C. 716
- D. 5040
- E. None of these

**Answer:** A

**Explanation:**





$${}^{16}C_4 = \frac{10 \cdot 9 \cdot 8 \cdot 7}{4 \cdot 3 \cdot 2 \cdot 1} = \frac{5040}{24} = 210$$

**16. In how many ways can 5 boys and 4 girls can be seated in a row so that they are in alternate position?**

- A. 2780
- B. 2880
- C. 2800
- D. 2980
- E. None of these

**Answer:** B

**Explanation:**

First boys are seated in 5 position in 5! Ways, now remaining 4 places can be filled by 4 girls in 4! Ways, so number of ways = 5! 4! = 2880

**17. In how many ways 5 African and five Indian can be seated along a circular table, so that they occupy alternate position.**

- A. 5! 5!
- B. 4! 5!
- C. 5! 4!
- D. 4! 4!
- E. None of these



**Answer:** B

**Explanation:**

First 5 African are seated along the circular table in (5-1)! Ways = 4!. Now Indian can be seated in 5! Ways, so 4! 5!

**18. There is meeting of 20 delegates is to be held in a hotel. In how many ways these delegates can be seated along a round table, if three particular delegates always seat together.**

- A. 17! 3!
- B. 18! 3!
- C. 17! 4!
- D. can't be determined
- E. None of these

**Answer:** A

**Explanation:**





Total 20 persons, 3 always seat together,  $17 + 1 = 18$  delegates can be seated in  $(18 - 1)!$  Ways =  $17!$  And now that three can be arranged in  $3!$  Ways. So,  $17! 3!$

**19. In how many 8 prizes can be given to 3 boys, if all boys are equally eligible of getting the prize.**

- A. 512
- B. 343
- C. 256
- D. 526
- E. None of these

Answer: A

Explanation:

Prizes cab be given in  $8 * 8 * 8$  ways = 512 ways

**20. There are 15 points in a plane out of which 6 are collinear. Find the number of lines that can be formed from 15 points.**

- A. 105
- B. 90
- C. 91
- D. 95
- E. None of these



Answer: C

Explanation:

From 15 points number of lines formed =  $15C_2$

6 points are collinear, number of lines formed by these =  $6C_2$

So total lines =  $15C_2 - 6C_2 + 1 = 91$

**21. In party there is a total of 120 handshakes. If all the persons shakes hand with every other person. Then find the number of person present in the party.**

- A. 15
- B. 16
- C. 17
- D. 18
- E. None of these

Answer: B

Explanation:



$$N_{C_2} = 120 \text{ (N is the number of persons)}$$

**22. There are 8 boys and 12 girls in a class. 5 students have to be chosen for an educational trip. Find the number of ways in which this can be done if 2 particular girls are always included**

- A. 812
- B. 816
- C. 818
- D. 820
- E. None of these

Answer: B

Explanation:

$$18_{C_3} = 816 \text{ (2 girls already selected)}$$

**23. In how many different ways the letters of the word INSIDE be arranged in such a way that all vowels always come together**

- A. 64
- B. 72
- C. 84
- D. 96
- E. None of these



Answer: B

Explanation:

Three vowels I, I and E can be arranged in  $3! / 2!$  Ways, remaining letters and group of vowels can be arranged in  $4!$  Ways. So  $4! * 3! / 2!$

**24. How many 3 digit number can be formed by 0, 2, 5, 3, 7 which is divisible by 5 and none of the digit is repeated.**

- A. 24
- B. 36
- C. 48
- D. 60
- E. None of these

Answer: A

Explanation:

Let three digits be ABC, a can be filled in 4 ways (2, 3, 5 and 7) c can be filled in 2 ways (0 or 5) and b can be filled in 3 ways. So,  $4 * 3 * 2 = 24$  ways



25. In a group of 6 boys and 8 girls, 5 students have to be selected. In how many ways it can be done so that at least 2 boys are included

- A. 1524
- B. 1526
- C. 1540
- D. 1560
- E. None of these

Answer: B

Explanation:

$${}^6C_2 * {}^5C_3 + {}^6C_3 * {}^5C_2 + {}^6C_4 * {}^5C_1 + {}^6C_5$$

26. In how many ways 5 rings can be worn on 3 fingers?

- A. 15
- B. 120
- C. 60
- D. 70
- E. 243

Answer: C

Explanation:

0 0 0

Let these 3 circles are 3 fingers



For 1st finger we have 5 choices, for second finger we have 4 choices left of rings, for third finger we have 3 choices left.

So total  $5 * 4 * 3 = 60$  ways

27. In how many ways the letters of the word 'AUTHOR' be arranged taking all the letters?

- A. 120
- B. 720
- C. 360
- D. 60
- E. None of these

Answer: B

Explanation:

AUTHOR contains 6 letters, so total  $6!$  Ways.



28. In how many ways the letters of the word 'MINIMUM' be arranged taking all the letters?

- A. 420
- B. 840
- C. 5040
- D. 720
- E. 360

Answer: A

Explanation:

MINIMUM contains 7 letters, so total 7! Ways. But it contains 2 I's and 3 M's so divide by 2! And 3!

$$\text{So ways } \frac{7!}{(2! * 3!)} = \frac{7*6*5*4*3*2*1}{2*1*3*2*1} = 420$$

29. How many words of 4 letters with or without meaning be made from the letters of the word 'LEADING', when repetition of letters is allowed?

- A. 4808
- B. 57600
- C. 2401
- D. 57624
- E. None of these



Answer: D

Explanation:

LEADING is 7 letters.

We have 4 places where letters are to be placed.

For first letter there are 7 choices, since repetition is allowed, for second, third and fourth letter also we have 7 choices each, so total of  $7*7*7*7$  ways = 2401 ways.

Now for arrangement of these 4 words, we have 4! Ways.

So total of  $2401 * 4!$  Ways.

30. In how many ways letters of word 'INVISIBLE' be arranged such that all vowels are together?

- A. 2560
- B. 2880
- C. 5040
- D. 2520
- E. 720

Answer: B



Explanation:

First make IIIE in a circle. So we have P&C-2-5

Now we have N, V, S, B, L and box, their arrangements can be done in 6!

Letters inside circle are also to be arranged, we have I, I, I, E so ways are  $\frac{4!}{3!}$

Total ways  $6! * \frac{4!}{3!}$

**31. How many words can be made out of the letters of word 'POUNDING' such that all vowels occupy odd places?**

- A. 1440
- B. 1400
- C. 7200
- D. 5600
- E. 40320

Answer: A

Explanation:

In POUNDING, there are 8 places

1 2 3 4 5 6 7 8

So for 3 places selection of vowels, we have 1, 3, 5, 7 number places  ${}^4C_3$  ways

Now for arranging these 3 vowels, ways are 3!

Remaining 5 are consonants (in which there are 2 N's) for which  $5!/2!$

so total ways =  ${}^4C_3 * 3! * (\frac{5!}{2!})$

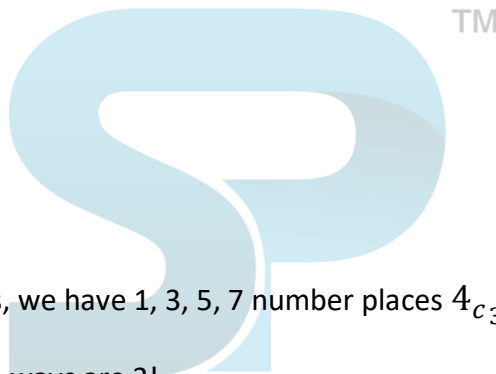
**32. In how many ways a group of 2 men and 4 women be made out of a total of 4 men and 7 women?**

- A. 720
- B. 210
- C. 420
- D. 360
- E. 120

Answer: B

Explanation:

We have to select 2 men from 4 men, and 4 women from 7 women





So total ways =  $4_{C_2} * 7_{C_4}$

**33. There are 8 men and 7 women. In how many ways a group of 5 people can be made such that at least 3 men are there in the group?**

- A. 1545
- B. 1626
- C. 1722
- D. 1768
- E. 1844

**Answer:** C

**Explanation:**

Case 1: 3 men and 2 women

$$8_{C_3} * 7_{C_2} = 1176$$

Case 2: 4 men and 1 women

$$8_{C_4} * 7_{C_1} = 490$$

Case 3: all 5 men

$$8_{C_5} = 56$$

Add all the cases.

**34. There are 6 men and 7 women. In how many ways a committee of 4 members can be made such that a particular woman is always included.**

- A. 180
- B. 120
- C. 240
- D. 220
- E. 260

**Answer:** D

**Explanation:**

There are total 13 people, a particular woman is to be included, and so now 12 people are left to chosen from and 3 members to be chosen. So ways are  $12_{C_3}$ .

**35. There are 5 men and 3 women. In how many ways a committee of 3 members can be made such that 2 particular men are always to be excluded.**





- A. 50
- B. 20
- C. 24
- D. 48
- E. None of these

Answer: B

Explanation:

Total 8 people, 2 men are to be excluded, so 6 men left to be chosen from and 3 members to be chosen. So ways are  ${}^6C_3$

**36. How many words of 4 letters with or without meaning be made from the letters of the word 'NUMBER', when repetition of letters is not allowed?**

- A. 480
- B. 360
- C. 240
- D. 360
- E. 24

Answer: D

Explanation:

NUMBER is 6 letters.

We have 4 places where letters are to be placed.



For first letter there are 6 choices, since repetition is not allowed, for second, third and fourth letter also we have 5, 4, and 3 choices resp., so total of  $6*5*4*3$  ways = 360 ways.

**37. In how many ways the letters of the word 'ALLIGATION' be arranged taking all the letters?**

- A. 120280
- B. 453600
- C. 360340
- D. 3628800
- E. None of these

Answer: B

Explanation:

ALLIGATION contains 10 letters, so total 10! Ways. There are 2 as, 2 Ls, 2 is

So  $10! / (2!*2!*2!)$



**38. In how many ways all the letters of the word 'MINIMUM' be arranged such that all vowels are together?**

- A. 60
- B. 30
- C. 90
- D. 70
- E. 120

Answer: A

Explanation:

Take vowels in a box together as one – IIU, M, N, M, and M

So there are 5 that to be placed for this 5! Now 3 MS, so 5! /3! So arrangement of vowels inside box gives 3! /2!

So total = 5! /3! \* 3! /2!

**39. In how many ways a group of 4 men and 3 women be made out of a total of 8 men and 5 women?**

- A. 720
- B. 140
- C. 120
- D. 360
- E. 210

Answer: B

Explanation:

Total ways =  $8C_4 * 5C_3$

**40. How many 3 digit numbers are divisible by 4?**

- A. 256
- B. 225
- C. 198
- D. 252
- E. 120

Answer: B

Explanation:

A number is divisible by 4 when its last two digits are divisible by 4

For this the numbers should have their last two digits as 00, 04, 08, 12, 16, and 96







By the formula,  $a_n = a + (n-1)d$

$$96 = 0 + (n-1) \cdot 4$$

$$n = 25$$

So there are 25 choices for last 2 digits and 9 choices (1-9) for the 1st digit

So total  $9 \cdot 25$

**41. How many 3 digits numbers have exactly one digit 2 in the number?**

- A. 225
- B. 240
- C. 120
- D. 160
- E. 185

Answer: A

Explanation:

0 cannot be placed at first digit to make it a 3 digit number.

3 cases:

Case 1: 2 is placed at first place

1 choice for the first place, 9 choices each for the 2nd and 3rd digit (0-9 except 2)

$$\text{So numbers} = 1 \cdot 9 \cdot 9 = 81$$

Case 2: 2 is placed at second place

8 choices for the first place (1-9 except 2), 1 choice for the 2nd digit and 9 choices for the 3rd digit (0-9 except 2)

$$\text{So numbers} = 8 \cdot 1 \cdot 9 = 72$$

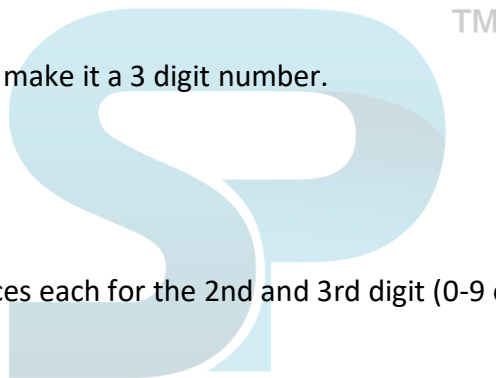
Case 3: 2 is placed at third place

8 choices for the first place (1-9 except 2), 9 choices for the 2nd digit (0-9 except 2) and 1 choice for the 3rd digit

$$\text{So numbers} = 8 \cdot 9 \cdot 1 = 72$$

$$\text{So total numbers} = 81 + 72 + 72 = 225$$

**42. There are 8 men and 7 women. In how many ways a group of 5 people can be made such that the particular woman is always to be included?**





- A. 860
- B. 1262
- C. 1001
- D. 1768
- E. 984

Answer: C

Explanation:

Total 15 people, and a particular woman is to be taken to form a group of 5, so choice is to be done from 14 people of 4 people

**43. There are 6 men and 7 women. In how many ways a committee of 4 members can be made such that a particular man is always to be excluded?**

- A. 280
- B. 420
- C. 220
- D. 495
- E. 460

Answer: D

Explanation:

There are total 13 people, a particular man is to be excluded, so now 12 people are left to chosen from and 4 members to be chosen. So ways are  ${}^{12}C_4$ .

**44. How many 4 digit words can be made from the digits 7, 8, 5, 0, and 4 without repetition?**

- A. 70
- B. 96
- C. 84
- D. 48
- E. 102

Answer: B

Explanation:

0 cannot be on first place for it to be a 4 digit number,

So for 1st digit 4 choices, for second also 4 (because 0 can be placed here), then 3 for third place, 2 for fourth place

Total numbers =  $4 \times 4 \times 3 \times 2$



45. In how many ways 8 students can be given 3 prizes such that no student receives more than 1 prize?

- A. 348
- B. 284
- C. 224
- D. 336
- E. None of these

Answer: D

Explanation:

For 1st prize there are 8 choices, for 2nd prize, 7 choices, and for 3rd prize – 6 choices left

So total ways =  $8 \times 7 \times 6$

46. In how many ways 5 Americans and 5 Indians be seated along a circular table, so that they are seated in alternative positions

- A.  $5! 5!$
- B.  $6! 4!$
- C.  $4! 5!$
- D.  $4! 4!$
- E. None of these



Answer: C

Explanation:

First Indians can be seated along the circular table in  $4!$  Ways and now Americans can be seated in  $5!$  Ways. So  $4! 5!$  Ways

47. 4 matches are to be played in a chess tournament. In how many ways can result be decided?

- A. 27
- B. 9
- C. 81
- D. 243
- E. None of these

Answer: C

Explanation:

Every chess match can have three result i.e. win, loss and draw

So now of ways =  $3 \times 3 \times 3 \times 3 = 81$  ways



**Directions (48 –49)** There are 6 players in a cricket which is to be sent to Australian tour. The total number of members is 12.

**48. If 2 particular member is always included**

- A. 210
- B. 270
- C. 310
- D. 420
- E. None of these

**Answer:** A

**Explanation:**

Only 4 players to select, so it can be done in  $10C_4 = 210$

**49. If 3 particular player is always excluded**

- A. 76
- B. 82
- C. 84
- D. 88
- E. None of these

**Answer:** C

**Explanation:**

6 players to be selected from remaining 9 players in  $9C_6 = 84$  ways



**50. In a group of 6 boys and 5 girls, 5 students have to be selected. In how many ways it can be done so that at least 2 boys are included**

- A. 1524
- B. 1526
- C. 1540
- D. 1560
- E. None of these

**Answer:** B

**Explanation:**

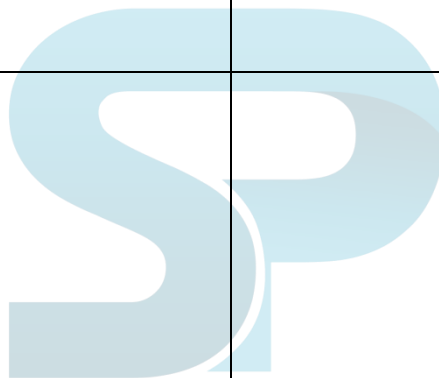
$$6C_2 * 5C_3 * 6C_3 * 5C_2 * 6C_4 * 5C_1 * 6C_5$$



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