

Quantitative Aptitude

Permutations & Combinations

Level-1

- Q1** How many different arrangements can be made from the letters of the word 'TUESDAY' such that all vowels don't come together?
(A) 4220 (B) 4230
(C) 4320 (D) 4300
(E) None of these
- Q2** **Directions: In how many ways the letters of the word "APPLE" are arranged?**
(A) 100 (B) 120
(C) 64 (D) 60
(E) None of these
- Q3** **Directions: In how many ways does the word "IDENTITY" be arranged in that all vowels and consonants come together?**
(A) 600 (B) 120
(C) 364 (D) 360
(E) None of these
- Q4** How many different arrangements can be made by using all the letters in the word "HINDUSTAN"?
(A) 121440 (B) 181220
(C) 122440 (D) 181440
(E) 141340
- Q5** How many number plates of four digits can be formed with six digits 1, 2, 3, 4, 5 and 6?
(A) 12 (B) 15
(C) 18 (D) 24
(E) 30
- Q6** How many 10-letter words can be formed by using the letters of the word DEPARTMENT?
(A) 907200 (B) 725760
(C) 1814400 (D) 453600
(E) 604800
- Q7** A person has a total of 6 bullets in his gun and he has to shoot 3 birds. In how many ways can he do that?
(A) 35 (B) 20
(C) 50 (D) 60
(E) None of these
- Q8** 3 men and 3 women are to sit at a round table. In how many different ways can they sit so that no 2 women sit together?
(A) 10 (B) 12
(C) 16 (D) 18
(E) none of these
- Q9** A man have 7 samosa, 6 juice and 8 candies. He has to choose 1 each of them. Then, find the number of ways he choose?
(A) 332 (B) 336
(C) 335 (D) 334
(E) None of these
- Q10** 15 people shake hands at a party such that one person does not shake hands with 5 persons. How many shake hands will take place?
(A) 105 (B) 110
(C) 100 (D) 90
(E) None of these
- Q11** Find the probability of words that can be formed from the letters of the word 'MONSTER' such that all the vowels come together.
(A) $\frac{1}{7}$
(B) $\frac{2}{7}$
(C) $\frac{3}{7}$
(D) $\frac{6}{7}$
(E) None of these
- Q12** A boy has 7 pairs of socks & 3 pairs of shoes. Then, find the number of ways of selecting



shocks & shoes together.

- (A) 21 (B) 22
(C) 10 (D) 11
(E) None of these

Q13 How many odd numbers of 5 digits can be formed using all the digits from 0 to 9 if repetition of digits is allowed?

- (A) 42000 (B) 45000
(C) 32000 (D) 72000
(E) None of these

Q14 Find the number of 5 letters words, with or without meaning, which can be formed from the letters of word QUANT, where the repetition of the letters is not allowed?

- (A) 180 (B) 720
(C) 280 (D) 120
(E) 200

Q15 How many different ways can the letters of the word WALLAH arranged?

- (A) 180 (B) 150
(C) 720 (D) 360
(E) None of these

Q16 In how many different ways can the letters of the word "MATHEMATICS" be arranged?

- (A) $11!/2!$ (B) $11!/6$
(C) $11!/8$ (D) $11!/4$

(E) None of these

Q17 How many 7-letter words can be formed by using the letters of the word FINANCE, so that vowels always come together?

- (A) 540 (B) 360
(C) 720 (D) 640
(E) 480

Q18 How many 6-letter words, beginning with a vowel and ending with a vowel, can be formed by using the letters of the word MARKET?

- (A) 72 (B) 36
(C) 64 (D) 48
(E) 60

Q19 How many 4 digits even number can be formed with the help of digits 0, 1, 3, 4, 7, 9, 6. while repetition not allowed.

- (A) 420 (B) 760
(C) 360 (D) 180
(E) 480

Q20 How many 3-digit even numbers can be formed by using the digits 2, 4, 6 and 8, when repetition is not allowed?

- (A) 64 (B) 16
(C) 24 (D) 32
(E) 48



Level-2

- Q1** How many 5-digit numbers can be formed by using the digits 2, 3, 5, 7 and 8, so that even numbers always come together and odd numbers always come together?
 (A) 24 (B) 18
 (C) 48 (D) 36
 (E) 30
- Q2** A volleyball team of six players is to be selected from a group of 7 male players and 5 female players. In how many ways a team having at least 4 female players is selected?
 (A) 102 ways (B) 105 ways
 (C) 108 ways (D) 112 ways
 (E) 120 ways
- Q3** How many 6-letter words can be formed by using the letters of the word ACTION, so that I come right after A and O comes right after I?
 (A) 120 (B) 24
 (C) 720 (D) 360
 (E) 48
- Q4** A team of 11 players has to be chosen from the groups consisting of 6 and 8 players respectively. The number of ways of selecting them so that each selection contains at least 4 players from the first group is
 (A) 120 (B) 280
 (C) 344 (D) 248
 (E) None of these
- Q5** **Directions: Study the following question carefully and choose the right answer given beside.**
 A group contains 12 girls and 15 boys out of which 5 girls and 7 boys are dancers and the rest are singers. A committee of 9 members is to be formed such that the committee contains 4 girls and 5 boys singers. Find the number of ways in which this can be done.
 (A) 26868 (B) 26998
 (C) 25668 (D) 28665
 (E) None of these
- Q6** **Directions: Study the following question carefully and choose the right answer given beside.**
 A group contains 12 boys and 15 girls out of which 5 boys and 7 girls are dancers and rest are singers. A committee of 5 members is to be formed. Find the number of ways in which this can be done such that the committee contains at least 3 girls singers.
 (A) 10765 (B) 10453
 (C) 10256 (D) 10962
 (E) None of these
- Q7** A team of 11 players has to be chosen from the groups consisting of 6 and 8 players respectively. The number of ways of selecting them so that each selection contains atleast 4 players from the first group is
 (A) 200 (B) 280
 (C) 344 (D) 160
 (E) None of these
- Q8** How many 10-letter words can be formed by using the letters of the word SMARTPHONE, so that vowels never come together?
 (A) $10! - (8! \times 3!)$
 (B) $11! - (6! \times 4!)$
 (C) $10! - (8! \times 4!)$
 (D) $10! - (7! \times 3!)$
 (E) $11! - (8! \times 3!)$
- Q9** Teacher have five Maths books and four non-Maths books, he gave all books to one of the students. In how many ways student can be arranged four Maths books and two non-Maths books on a shelf?
 (A) 20600 (B) 20800
 (C) 21600 (D) 22000
 (E) 23000



Q10 A test contains 8 easy level questions, 10 moderate level questions and 4 hard level questions. In how many ways can a student attempt a total of 12 questions such that he attempts the same number of questions from each level?

- (A) 8400 (B) 16800
(C) 2100 (D) 14700
(E) None of these

Q11 In an office 7 employees work in the content department 4 of them are female and 3 males and in the IT department 7 employees work in which 3 of them are female and 4 are male. In how many ways can they invite 3 females and 3 males for a dinner party so that there are 3 of the content department and 3 of the IT department?

- (A) 460 (B) 480
(C) 485 (D) 495
(E) 545

Q12 A company interviewed 6 candidates for HR department and 4 candidates for marketing department. In how many ways can 5 candidates be selected in the company, so that at most 2 of them are selected in marketing department?

- (A) 240 (B) 126
(C) 480 (D) 186
(E) 236

Q13 How many 9-letter words can be formed with the letters of the word CLASSROOM, so that all the S come together at the start of the word and all the O come together at the end of the word?

- (A) 720 (B) 24
(C) 120 (D) 5
(E) 5040

Q14 In how many ways can the letters of the word PHYSICSWALLAH arranged with or without meaning?

- (A) $\frac{13!}{2!2!2!2!}$

- (B) $\frac{13!}{2!2!2!}$
(C) $\frac{2!2!3!2!}{13!}$
(D) $\frac{2!2!2!2!}{12!}$

(E) None of these

Q15 How many 9-letter words can be formed by using the letters of the word COMMITTEE, so that vowels always come together and consonants always come together?

- (A) 540 (B) 360
(C) 720 (D) 640
(E) 480

Q16 How many garlands of 4 lily flowers and 8 rose flowers can be made such that lily flowers do not come adjacent?

- (A) $7! \times 4!$
(B) $7! \times C_4^8$
(C) $C_4^8 \times 4!$
(D) $7! \times C_4^8 \times 4!$
(E) None of these

Q17 In a bag contains 2 orange and 3 apples. If 2 fruits are selected, in how many ways that can be selected such that at least one apple?

- (A) 8 (B) 9
(C) 10 (D) 11
(E) 5

Q18 Radha has 11 pairs of shoes and 7 pairs of socks. How many ways can he wear these shoes and socks (must taking similar pairs of each)

- (A) 18 (B) 77
(C) 22 (D) 130
(E) 150

Q19 Ritu 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

- (A) 196 (B) 296
(C) 396 (D) 293
(E) None of these

Q20 In a class with 3 boys and 2 girls, two students were selected. In how many different ways can



they be selected such that at least one girl should be there?

(A) 5

(B) 7

(C) 8

(E) None of these

(D) 6



Level-3

- Q1** In a game of archery, A is given 4 chances, B is given 2 chances and C is given 3 chances to hit the bull's eye. In how many ways, can each of them hit the bull's eye 2 times?
(A) 18 (B) 48
(C) 32 (D) 36
(E) 20
- Q2** There are 10 boys and 8 girls out of which a team of 8 players to be selected. In how many ways can a team be selected if at least 4 girls and 2 boys should be in the team?
(A) 21840 (B) 22680
(C) 21420 (D) 22480
(E) None of these
- Q3** In a group of 4 boys and 3 girls, three children are to be selected. In how many different ways can they be selected such that at least one boy should be there?
(A) 60 (B) 56
(C) 34 (D) 28
- Q4** In a group of 7 boys and 9 girls, 5 members are to be selected. In how many different ways can they be selected such that at least one boy should be there?
(A) 2450 (B) 4242
(C) 1840 (D) 4280
(E) None of these
- Q5** In a hall, 4 persons can speak only Hindi, 6 can speak only English and 5 can speak both Hindi and English. In how many ways 3 persons can be shortlisted who can speak Hindi?
(A) 90 (B) 72
(C) 84 (D) 120
(E) 108
- Q6** In a meeting, everyone has shaken hands with everyone, it was found that 120 handshakes were exchanged. How many members were presenting in the meeting?
(A) 14 (B) 15
(C) 16 (D) 17
(E) None of these
- Q7** There are fifteen boxes numbered 1, 2, 3 ... up to 15. Each box is to be filled with either apples or mangoes such that at least one box contains mangoes and the boxes containing mangoes are alternatively numbered. Find the number of ways in which this can be done?
(A) 12 (B) 33
(C) 64 (D) 78
(E) 52
- Q8** The bank manager forms a secret 2 – digit code from the numbers 0 –9. But he set code as the first digit will not be 0 and the second number will not be even number. Then what are the possible ways to set the code?
(A) 54 (B) 55
(C) 64 (D) 45
(E) None of these
- Q9** Number of ways to form a committee of 4 members from 6 males and X females, in such a way that the number of males is always more than that of females and there is at least 1 female, is 80. Find the value of X?
(A) 6 (B) 5
(C) 2 (D) 4
(E) 3
- Q10** In how many ways can a person go from Kanpur to Bangalore via Delhi or direct if there are 5 possible ways from Kanpur to Delhi and 8 possible ways from Delhi to Bangalore and 10 direct ways from Kanpur to Bangalore?
(A) 50 (B) 60
(C) 40 (D) 45
(E) 75



Answer Key

Level-1

Q1 (C)
Q2 (D)
Q3 (D)
Q4 (D)
Q5 (B)
Q6 (A)
Q7 (B)
Q8 (B)
Q9 (B)
Q10 (C)

Q11 (C)
Q12 (A)
Q13 (B)
Q14 (D)
Q15 (A)
Q16 (C)
Q17 (B)
Q18 (D)
Q19 (C)
Q20 (C)



Level-2

Q1 (A)
Q2 (D)
Q3 (B)
Q4 (C)
Q5 (D)
Q6 (D)
Q7 (C)
Q8 (A)
Q9 (C)
Q10 (D)

Q11 (C)
Q12 (D)
Q13 (C)
Q14 (A)
Q15 (C)
Q16 (D)
Q17 (B)
Q18 (B)
Q19 (A)
Q20 (B)



Level-3

Q1 (A)
Q2 (B)
Q3 (C)
Q4 (B)
Q5 (C)

Q6 (C)
Q7 (C)
Q8 (D)
Q9 (D)
Q10 (A)



Hints & Solutions

Level-1

Q1 Text Solution:

Total number of arrangements if no restrictions:

$$7! = 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 = 5040$$

In our case there are 3 vowels in word 'TUESDAY' i.e. 'U', 'E', 'A'. So grouping them as single bundle.

Total number of arrangements if vowels are always together :

$$5! \times 3! = 120 \times 6 = 720$$

Total number of arrangements if vowels don't come together :

$$5040 - 720 = 4320$$

Hence, "4320" is the correct answer.

Q2 Text Solution:

Ans: 60

$$\text{Required number of ways} = \frac{5!}{2!} = \frac{5 \times 4 \times 3 \times 2!}{2!}$$

Q3 Text Solution:

Ans: 360

Number of vowels = I, E, I = 3

Number of consonants = D, N, T, T, Y = 5

$$\text{Required number of ways} = \frac{5! \times 3! \times 2!}{2! \times 2!} = \frac{5 \times 4 \times 3 \times 2 \times 1 \times 3}{2!} = 360$$

Q4 Text Solution:

There are 9 letters and N is used two times.

Hence the number of words by taking all together at a time

$$= \frac{9!}{2!} = \frac{9 \times 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1}{2} = 181440$$

Q5 Text Solution:

Required number

$$= n_{C_r} = {}^6C_4 = \frac{6!}{(6-4)!4} = \frac{6 \times 5}{2 \times 1} = 15$$

Q6 Text Solution:

There are 10 letters, in which E repeated two times and T repeated two times.

$$\text{So, total number of words} = \frac{10!}{2! \times 2!} = 10 \times 9 \times 8 \times 7 \times 6 \times 5 \times 3 \times 2 = 907200$$

Q7 Text Solution:

He can choose any 3 bullets to kill the birds out of the total available 6 bullets.

$$\text{Total number of ways} = {}^6C_3 = 20$$

Q8 Text Solution:

3 men can sit at a round table $(3-1)!$ Ways i.e. $2!$
Now, 3 women are to sit so that no 2 women sit together.

They have to sit three places each between two men. It can be done in $3P_3$ ways i.e. $3! = 3 \times 2 \times 1 = 6$ ways.

Thus, required number of ways $= 2 \times 6 = 12$ ways

Q9 Text Solution:

We have to use Fundamental theorem of countings

$$\text{Total number of ways} = 7 \times 6 \times 8 = 336$$

Q10 Text Solution:

Total number of shake hands when everyone shake hands with everyone $= {}^nC_2 = 105$

Since one person does not shake hands with 5 people which there will be 5 less shake hands out of total.

$$\text{Hence, required number of shake hands} = 105 - 5 = 100$$

Q11 Text Solution:

Total number of ways $= 7!$

Favorable number of ways $= 6! \times 2!$

$$\text{Required probability} = \frac{6! \times 2!}{7!} = \frac{2}{7}$$

Hence " $\frac{2}{7}$ " is the right answer.

Q12 Text Solution:

Answer - a

In this question, we have to use fundamental theorem of counting

$$7 \times 3 = 21 \text{ ways}$$

Q13 Text Solution:

For a 5-digit number to be odd, the units digit must be one of 1, 3, 5, 7, or 9. For the remaining four digits, we can choose any digit from the set $\{0, 1, 2, 3, 4, 5, 6, 7, 8, 9\}$ with repetition allowed excluding 0 at the thousand's place.



Therefore, the number of odd 5-digit numbers that can be formed

is:

$$= 5 \times 9 \times 10 \times 10 \times 10 \\ = 45,000$$

Q14 Text Solution:

Total number of 5 letters words that can be formed = $5! = 120$

Q15 Text Solution:

$$\text{Number of ways} = \frac{6!}{2!2!} = 180$$

Q16 Text Solution:

$$\text{Total number of ways} = \frac{11!}{(2! \times 2! \times 2!)} = \frac{11!}{8}$$

Q17 Text Solution:

Since, there are three vowels I, A and E.

So, I, A and E will be counted as a single letter.

Number of ways to arrange 5 letters F, N, N, C and IAE in 5 places = $\frac{5!}{2!}$

Since, number of ways to arrange 3 letters I, A and E among themselves in 3 places = $3!$

So, number of words in which vowels always come together = $\frac{5!}{2!} \times 3! = 5 \times 4 \times 3 \times 3 \times 2 = 360$

Q18 Text Solution:

Since, there are two vowels A and E in the given word.

So, the number of ways to arrange A and E in two places = $2!$

Remaining letters are M, R, K and T.

So, the number of ways to arrange 4 letters in 4 places = $4!$

So, total number of words beginning with a vowel and ending with a vowel = $2! \times 4! = 2 \times 24 = 48$

Q19 Text Solution:

To form a 4-digit even number, the units digit must be even. Therefore, we can choose the units digit in 3 ways (0, 4, or 6).

After selecting the units digit, we can choose any of the remaining 6 digits for the thousands place. This can be done in 6 ways.

For the hundreds and tens places, we can choose from the

remaining 5 digits (excluding the units digit and the thousands digit). These

two digits can be arranged in $5P2$ ways, which is equal to 20.

Therefore, the total number of 4-digit even numbers that can be

formed with the digits 0, 1, 3, 4, 7, 9, 6 without repetition is:

$$3 \times 6 \times 20 = 360$$

Hence, there are 360 such 4-digit even numbers that can be

formed with the given digits without repetition.

Q20 Text Solution:

Since, each of the given digits is an even number.

So, number of ways to fill the hundred's place with 4 digits = 4

Number of ways to fill the ten's place with remaining 3 digits = 3

And number of ways to fill the unit place with remaining 2 digits = 2

So, required number of 3-digit even number = $4 \times 3 \times 2 = 24$



Level-2

Q1 Text Solution:

Since, there are two even numbers and three odd numbers

So, number of ways to put both the even numbers together = $2!$

And number of ways to put all the three odd numbers together = $3!$

Since, both the two even numbers will be counted as a single digit and all the three odd numbers will be counted as a single digit.

So, number of ways to put both the two even numbers and all the three odd numbers together = $2!$

Required number of 5-digit numbers, in which even numbers always come together and odd numbers always come together = $2! \times 3! \times 2! = 2 \times 6 \times 2 = 24$

Q2 Text Solution:

Case I: 4 female players and 2 male players are there in the team.

So, the number of ways = ${}^5C_4 \times {}^7C_2 = 5 \times 21 = 105$ ways

Case II: 5 female players and 1 male player are there in the team.

So, the number of ways = ${}^5C_5 \times {}^7C_1 = 1 \times 7 = 7$ ways

So, required total number of ways = $105 + 7 = 112$ ways

Hence, option d.

Q3 Text Solution:

Since, AIO will be counted as one letter.

So, the number of ways to arrange 4 letters AIO, C, T and N in 4 places = $4! = 4 \times 3 \times 2 \times 1 = 24$

Q4 Text Solution:

Case 1: Selecting exactly 4 players from the first group and 7 players from the second group

The total number of ways for this case is $C(6, 4) \times C(8, 7) = 15 \times 8 = 120$.

Case 2: Selecting exactly 5 players from the first group and 6

players from the second group:

The total number of ways for this case is $C(6, 5) \times C(8, 6) = 6 \times 28 = 168$.

Case 3: Selecting exactly 6 players from the first group and 5

players from the second group:

The total number of ways for this case is $C(6, 6) \times C(8, 5) = 1 \times 56 = 56$.

Therefore, total number of ways for these cases is $120 + 168 + 56 = 344$.

Q5 Text Solution:

From the given information,

Total number of boys = 12

Boys dancers = 5

Boys singers = 7

Total number of girls = 15

Girls dancers = 7

Girls singers = 8

Required number of ways

$$= {}^{15}C_4 \times {}^7C_5 = 1365 \times 21 = 28665$$

Therefore, the number of ways is 28665 in which a committee of 9 members is to be formed such that the committee contains 4 girls and 5 boys singers.

Q6 Text Solution:

From the given information,

Total number of Boys = 12

Boys dancers = 5

Boys singers = 7

Total number of girls = 15

Girls dancers = 7

Girls singers = 8

$$\text{Required number of ways} = {}^8C_3 \times {}^{19}C_2 + {}^8C_4 \times {}^{19}C_1 + {}^8C_5$$

$$= 56 \times 171 + 70 \times 19 + 56$$

$$= 9576 + 1330 + 56$$

$$= 10962$$

Therefore, the number of ways in which a committee of 5 members is to be formed such



that the committee contains at least 3 girls singers is 10962.

Q7 Text Solution:

Firs t gro up	Firs t gro up	Number of ways of selection
4	7	${}^6C_4 \times {}^8C_7$ $= 15 \times 8$ $= 120$
5	6	${}^6C_5 \times {}^8C_6$ $= 6 \times 28$ $= 168$
6	5	${}^6C_6 \times {}^8C_5$ $= 7 \times 8$ $= 56$

Hence required number of ways = $120 + 168 + 56 = 344$

Q8 Text Solution:

Since, there are three vowels A, O and E in the given word.

Let us count A, O and E together as a single letter.

Number of ways to arrange 8 letters S, M, R, T, P, H, N and AOE in 8 places = $8!$

Number of ways to arrange 3 letters A, O and E among themselves = $3!$

Total number of words, in which vowels always come together = $8! \times 3!$

Since, total number of words, which can be formed by using the letters of the word SMARTPHONE = $10!$

So, total number of words, in which vowels never come together:

$$10! - (8! \times 3!)$$

Q9 Text Solution:

4 Maths books can be selected out of 5 in 5C_4 ways

2 non-Maths books can be selected out of 4 in 4C_2 ways. Number of ways of arranging Maths and non-Maths

$$= {}^5C_4 \times {}^4C_2 = 5 \times 6 = 30$$

After selecting any 6 books (i.e. 4 Maths books and 2 non-Maths books) in one of the 30 ways, they can be arranged on the shelf in $6! = 720$ ways

$$\text{Required arrangement} = 720 \times 30 = 21600$$

Q10 Text Solution:

Since the student attempted a total of 12 questions (same number of questions from each level). Which means he must attempt 4 questions from each section.

$$\begin{aligned} \text{Hence, required number of ways} &= {}^8C_4 \times {}^{10}C_4 \times {}^4C_4 \\ &= 70 \times 210 \times 1 \\ &= 14700 \end{aligned}$$

Q11 Text Solution:

There four possibilities:

(i) 3 females from content department and 3 male from IT department

No. of ways in this case

$$= {}^4C_3 \times {}^4C_3 = 4 \times 4 = 16$$

(ii) 3 males from content department and 3 females from IT department.

$$\text{No. of ways in this case} = {}^3C_3 \times {}^3C_3 = 1 \times 1 = 1$$

(iii) 2 females and one males from content department and lady and 2 males from IT department

No. of ways in this case

$$= ({}^4C_4 \times {}^3C_1) \times ({}^3C_1 \times {}^4C_2) = 6 \times 3 \times 3 \times 6 = 324$$

(iv) One females and 2 males from content department and 2 females and one males from IT department

No. of ways in this case

$$= ({}^4C_1 \times {}^3C_2) \times ({}^3C_2 \times {}^4C_1) = 4 \times 3 \times 3 \times 4 = 1444$$

Hence the total no. of ways are

$$= 16 + 1 + 324 + 144 = 485.$$



Q12 Text Solution:

Number of ways to select 3 candidates in HR and 2 candidates in marketing department:

$$C_3^6 \times C_2^4 = 20 \times 6 = 120$$

Number of ways to select 4 candidates in HR and 1 candidate in marketing department:

$$C_4^6 \times C_1^4 = 15 \times 4 = 60$$

Number of ways to select all the 5 candidates in HR department:

$$C_5^6 = 6$$

Required number of ways = $120 + 60 + 6 = 186$

Q13 Text Solution:

Since, there are two S and two O in the given word.

So, positions of both the S and both O are fixed.

Since, positions of both S and both O are fixed.

So, the number of ways to arrange the remaining 5 letters C, L, A, R and M in 5 places = $5!$

$$= 5 \times 4 \times 3 \times 2 \times 1$$

$$= 120$$

Q14 Text Solution:

Total number of letters in the word = 13

Number of $H = 2$

Number of $S = 2$

Number of $A = 2$

Number of $L = 2$

$$\text{Number of ways} = \frac{13!}{2!2!2!2!}$$

Q15 Text Solution:

Vowels O, I, E and E can be arranged together among themselves in $4!$ ways.

Consonants C, M, M, T and T can be arranged together among themselves in $5!$ ways..

Since, all the vowels together and all the consonants together can be arranged in $2!$ Ways.

So, total number of words, in which vowels come together and consonants come together:

$$\frac{4! \times 5! \times 2!}{2! \times 2! \times 2!} = 4 \times 3 \times 5 \times 4 \times 3 = 720$$

Q16 Text Solution:

First we will make a garland of 8 rose flowers and this can be done in $(8 - 1)! = 7!$ Ways

Now we are left with 8 spaces between rose flowers. We will choose 4 spaces out of available 8 spaces and this can be done in C_4^8 ways.

Finally we can arrange those 4 lily flowers in $4!$ Ways.

$$\text{Hence, total ways} = 7! \times C_4^8 \times 4!$$

Q17 Text Solution:

Total number of ways to select 2 fruits from the bag = $C(5,2) = 5!/(3!2!) = 10$

Number of ways to select 2 oranges from the bag = $C(2,2) = 1$

Number of ways to select 2 fruits with at least one apple =

Total number of ways to select 2 fruits - Number of ways to select 2 oranges = $10 - 1 = 9$

Q18 Text Solution:

$$\text{Total number of ways} = 11 \times 7 = 77$$

Q19 Text Solution:

There are two cases

1. When 4 is selected from the first 5 and rest 6 from remaining 8

$$\text{Total arrangement} = {}^5C_4 \times {}^8C_6$$

$$= 5 \times \frac{8 \times 7}{2 \times 1}$$

$$= 5 \times 4 \times 7$$

$$= 140$$

2. When all 5 is selected from the first 5 and rest 5 from remaining 8

$$\text{Total arrangement} = {}^5C_5 \times {}^8C_5$$

$$= \frac{8 \times 7 \times 6}{3 \times 2 \times 1}$$

$$= 8 \times 7$$

$$= 56$$

Now, total number of choices available = $140 + 56 = 196$

Q20 Text Solution:

Total number of ways to select 2 students = $C(5,2) = 5!/(2!3!) = 10$

Number of ways to select 2 boys = $C(3,2) = 3$

Number of ways to select 2 students with at least 1 girl = Total



number of ways to select 2 students - Number
of ways to select 2 boys = $10 - 3 = 7$

Therefore, there are 7 different ways to select 2
students from the class such that at least one
girl is selected.



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Level-3

Q1 Text Solution:

Required number of ways:

$$\begin{aligned} C_2^4 \times C_2^2 \times C_2^3 \\ = 6 \times 1 \times 3 \\ = 18 \end{aligned}$$

Q2 Text Solution:

Case 1: Selecting exactly 4 girls and 4 boys

The total number of ways for this case is $C(8, 4) \times C(10, 4) = 70 \times 210 = 14,700$.

Case

2: Selecting exactly 5 girls and 3 boys

The total number of ways for this case is $C(8, 5) \times C(10, 3) = 56 \times 120 = 6,720$.

Case

3: Selecting exactly 6 girls and 2 boys:

The total number of ways for this case is $C(8, 6) \times C(10, 2) = 28 \times 45 = 1,260$.

Therefore,

Total number of ways = $14700 + 6720 + 1260 = 22680$

Q3 Text Solution:

Total number of ways to select 3 children from the group = $C(7,3) = 7!/(4!3!) = 35$

Number of ways to select 3 girls from the group = $C(3,3) = 1$

Number of ways to select 3 children with at least one boy = Total number of ways to select 3 children - Number of ways to select 3 girls = $35 - 1 = 34$

Therefore, there are 34 different ways to select three children from a group of 4 boys and 3 girls such that at least one boy is selected.

Hence, 34 is the right answer.

Q4 Text Solution:

Total number of ways to select 5 members from the group = $C(16,5) = 16!/(11!5!) = 4368$

Number of ways to select 5 girls from the group = $C(9,5) = 9!/(4!5!) = 126$

Number of ways to select 5 members with at least one boy = Total number of ways to select

5 members - Number of ways to select 5 girls = $4368 - 126 = 4242$

Q5 Text Solution:

Total persons who can speak Hindi = Total person who can speak only Hindi + Total persons who can speak both Hindi and English = $4 + 5 = 9$

Required number of ways = C_3^9

$$\begin{aligned} &= \frac{9!}{3!(9-3)!} \\ &= \frac{9 \times 8 \times 7 \times 6!}{3 \times 2 \times 1 \times 6!} \\ &= \frac{9 \times 8 \times 7}{3 \times 2} \\ &= 84 \end{aligned}$$

Q6 Text Solution:

Number of handshaken = ${}^nC_2 = \frac{n(n-1)}{2} = 120$

$$= n(n-1) = 240$$

$$= n^2 - n - 240 = 0$$

$$= n^2 - 16n + 15n - 240 = 0$$

$$= n(n-16) + 15(n-16) = 0$$

$$= (n-16)(n+15) = 0$$

$$n = 16, -15$$

Number of people in meeting = 16

Q7 Text Solution:

Case (i): if only one box contains Mangoes, then it can be one of the 15 boxes, so it can be done in 15 ways.

Case (ii): if only 2 boxes contain Mangoes, Then, boxes which can have Mangoes will be, (1, 3) or (2, 4) or (3, 5) or ... (13, 15) = 13 ways.

Case (iii): if only 3 boxes contain Mangoes, Then, boxes which can have Mangoes will be, (1, 3, 5) or (2, 4, 6) or (3, 5, 7) or ... (11, 13, 15) = 11 ways

Case (iv): if only 4 boxes contain Mangoes, Then, boxes which can have Mangoes will be, (1, 3, 5, 7) or (2, 4, 6, 8), or ... (9, 11, 13, 15) = 9 ways

Case (v): if only 5 boxes contain Mangoes,



Then, boxes which can have mangoes will be, (1, 3, 5, 7, 9) or (2, 4, 6, 8, 10) or ... (7, 9, 11, 13, 15)

= 7 ways

Case (vi): if only 6 boxes contain Mangoes,

Then, boxes which can have Mangoes will be, (1, 3, 5, 7, 9, 11) or (2, 4, 6, 8, 10, 12) or ... (5, 7, 9, 11, 13, 15)

= 5 ways

Case (vii): if only 7 boxes contain Mangoes,

Then, boxes which can have Mangoes will be, (1, 3, 5, 7, 9, 11, 13) or (2, 4, 6, 8, 10, 12, 14) or (3, 5, 7, 9, 11, 13, 15) = 3 ways

Case (viii): if only 8 boxes contain Mangoes,

Then, boxes which can have Mangoes will be, (1, 3, 5, 7, 9, 11, 13, 15) = 1 ways

Therefore, total number of required ways = $15 + 13 + 11 + 9 + 7 + 5 + 3 + 1 = 64$ ways.

Hence, option c.

$$= 5 \times 8 + 10$$

$$= 40 + 10$$

$$= 50$$

Q8 Text Solution:

Since the bank manager has set the condition that the first digit cannot be 0, there are 9 possible choices for the first digit (1, 2, 3, 4, 5, 6, 7, 8, 9).

Since the second digit cannot be an even number, there are 5 possible choices for the second digit (1, 3, 5, 7, 9).

Therefore, there are $9 \times 5 = 45$ possible ways to set the code according to the given conditions.

Q9 Text Solution:

Since, number of males is always more than that of females and there is at least 1 female.

So, number of ways to select 3 males and 1 female: ${}^6C_3 \times {}^x C_1 = 80$

$$\frac{6!}{3! \times 3!} \times \frac{X!}{1! \times (X-1)!} = 80$$

$$20 \times X = 80$$

$$X = 4$$

Q10 Text Solution:

Total number of ways to reach Bangalore from Kanpur = Total number of ways to reach Delhi from Kanpur \times Total number of ways to reach Bangalore from Delhi + Total number of ways to reach Bangalore directly from Kanpur

