MBA PIONEER 2024

QUANTITATIVE APTITUDE

DPP: 01

P and C - 1

Q1 How many five digit numbers can be formed with the digits 0, 4, 5, 8 and 9 without having any repetition of digits ?
(A) 96 (B) 120
(C) 100 (D) 60

Q2 How many five digit numbers can be formed with the digits 0, 4, 5, 8 and 9 where repetition of digits is allowed ?
(A) 3125 (B) 2500
(C) 120 (D) 96

Q3 How many even five digit numbers can be formed with the digits 0, 4, 5, 8 and 9 without having any repetition of digits ?
(A) 96 (B) 75
(C) 60 (D) 45

Q4 How many even four digit numbers can be formed with the digits 0, 4, 5, 8 and 9 where repetition of digits is allowed ?
(A) 60 (B) 125
(C) 250 (D) 300

Q5 How many five digit numbers divisible by four can be formed with the digits 0, 4, 5, 8 and 9 without having any repetition of digits ?
(A) ***32*** (B) 45
(C) 48 (D) 60

Q6 How many four digit numbers divisible by four can be formed with the digits 0, 4, 5, 8 and 9 where repetition of digits is allowed ?
(A) 200 (B) 180
(C) 120 (D) 90

Q7 How many five digit numbers where 5 and 8 are together can be formed with the digits 0, 4, 5, 8 and 9 without having any repetition of digits ?
(A) 28 (B) 32
(C) 36 (D) 42

Q8 How many five digit numbers where 5 is before 8 can be formed with the digits 0, 4, 5, 8 and 9 without having any repetition of digits ?
(A) 64 (B) 60
(C) 52 (D) 48

Q9 How many five digit numbers where 5 is before 8, and 9 is before 4, can be formed with the digits 0, 4, 5, 8 and 9 without having any repetition of digits ?
(A) 24 (B) 28
(C) 36 (D) 42

Q10 From the word HOSPITAL, how many distinct eight lettered English words (with or without proper meaning) starting with H can be formed ?
(A) 5240 (B) 5040
(C) 4850 (D) 4750

Q11 From the word HOSPITAL, how many distinct eight lettered English words (with or without proper meaning) starting with H and ending with T can be formed ?
(A) 580 (B) 640
(C) 720 (D) 860

Q12 From the word HOSPITAL, how many distinct eight lettered English words (with or without proper meaning) starting with H, ending with T and having A and S together can be formed ?

(A) 300 (B) 286
(C) 264 (D) 240

Q13 From the word HOSPITAL, how many distinct eight lettered English words (with or without proper meaning) starting with H and having all the vowels together can be formed ?

(A) 720 (B) 680
(C) 560 (D) 480

Q14 How many distinct eight lettered English words (with or without proper meaning) can be formed from the word ANALYSIS?

(A) 10800 (B) 10080
(C) 8100 (D) 1080

Q15 Find the number of six digit numbers that can be made using the digits 2, 3, 0, 6, 8 and 9 without having any repitition of digits?

(A) 720 (B) 600
(C) 480 (D) 360

Q16 Find the number of distinct 5 letter words that can be formed with the letters of the word "BOOST" using each letter exactly once such that they always start with S but never end with T?

(A) 18 (B) 6
(C) 9 (D) 12

Q17 There are 5 interns and 6 nurses in a ward. In how many ways can a team of 4 members be created for the night shift such that Sister Pooja - a nurse - is always present in the team?

(A) 120 (B) 180
(C) 200 (D) 210

Q18 There are 5 interns and 6 nurses in a ward. In how many ways can a team of 4 members be created for the day shift such that Intern Manoj is never present in the team ?

(A) 220 (B) 210
(C) 200 (D) 180

Q19 There are 5 interns and 6 nurses in a ward. In how many ways can a team of 4 members be created for the day shift such that there is exactly only one nurse present in the team ?

(A) 210 (B) 120
(C) 60 (D) 24

Q20 There are 5 interns and 6 nurses in a ward. In how many ways can a team of 4 members be created for the noon shift such there is at least one nurse always present in the team ?

(A) 175 (B) 210
(C) 270 (D) 325

Q21 There are 5 interns and 6 nurses in a ward. In how many ways can a team of 4 members be created for the evening shift such that there is at least one nurse and at least two interns always present in the team ?

(A) 210 (B) 200
(C) 180 (D) 175

Q22 How many distinct ten lettered English words can be formed from 5 distinct consonants and 5 distinct vowels such that no two consonants and no two vowels are adjacent ?

(A) 20808 (B) 28800
(C) 28080 (D) 28008

Q23 How many distinct eight lettered english words can be formed from 5 specifically given consonants and 3 specifically given vowels such that no two vowels are adjacent ?

(A) 24008 (B) 22040

(C) 14400 (D) 12040

Q24 Mr Ram goes to a restaurant for lunch. In the menu card there are four types of mocktails, six types of starters, eleven types of main courses and three types of desserts. In how many ways can Mr Ram order his lunch if he wishes to have one item of each ?

(A) 414 (B) 524

(C) 672 (D) 792

Q25 Mr Ram went to a meeting having a total of 11 other members. After Mr Ram arrived, all the members of the meeting shook hands with each other. How many handshakes took place ?

(A) 66 (B) 75

(C) 80 (D) 98

Q26 Mr Ram went to a Diwali party having a total of 11 other members. After Mr Ram arrived, all the members of the meeting exchanged Diwali gifts with each other. How many total Diwali gifts were exchanged at the party ?

(A) 148 (B) 132

(C) 102 (D) 66

Q27 Mr Ram has 11 friends. In how many ways can he invite 9 or more friends to his home for dinner ?

(A) 65 (B) 66

(C) 67 (D) 68

Q28 A double decker bus in London can accommodate 70 passengers. 40 of them can be accommodated in the lower deck, and 30 in the upper deck. In how many ways can the passengers be accommodated if 15 passengers refuse to be in the upper deck and 10 others refuse to be in the lower deck ?

(A) $\left(\frac{70!*40!*30!}{25!*20!}\right)$

(B) $\left(\frac{70!}{40!*30!}\right)$

(C) (70!*40!*30!)

(D) $\left(\frac{45!*40!*30!}{25!*20!}\right)$

Q29 How many words can be formed out of all letters of the word "ARTICLE"so that vowels occupy the even places?

(A) 36 (B) 288

(C) 144 (D) 72

Q30 Find the number of arrangements of all the letters of the word" MARUTI" if "U" always comes before " A" ?

(A) 420 (B) 360

(C) 180 (D) 60

Answer Key

Q1	(A)
Q2	(B)
Q3	(C)
Q4	(D)
Q5	(A)
Q6	(B)
Q7	(C)
Q8	(D)
Q9	(A)
Q10	(B)
Q11	(C)
Q12	(D)
Q13	(A)
Q14	(B)
Q15	(B)
Q16	(C)
Q17	(A)
Q18	(B)
Q19	(C)
Q20	(D)
Q21	(A)
Q22	(B)
Q23	(C)
Q24	(D)
Q25	(A)
Q26	(B)
Q27	(C)
Q28	(D)
Q29	(C)
Q30	(B)

Hints & Solutions

Q1 Text Solution:

The left-hand most digit can be filled up in 4 ways, as the digit 0 is not allowed there.

The next digit can be filled up in 3 + 1 = 4 ways, as 0, along with the remaining three digits, are allowed.

The next digit can be filled up in 3 ways, the tens digit in 2 ways and the units digit in 1 way.

Hence, 4*4*3*2*1 = 96 five digit numbers can be formed with the digits 0, 4, 5, 8 and 9 without having any repetition of digits

Q2 Text Solution:

The left-hand most digit can be filled up in 4 ways, as the digit 0 is not allowed there.

The next digit can be filled up in 5 ways, as 0, along with all the remaining four digits, are allowed.

The next digit can also be filled up in 5 ways, the tens digit in 5 ways and the units digit in 5 ways.

Hence, 4*5*5*5*5 = 2500 five digit numbers can be formed with the digits 0, 4, 5, 8 and 9 where repetition of digits is allowed

Q3 Text Solution:

The property of any even number is that the units digit of the number should be even.

This is possible in this case in the following three ways :

1) _ _ _ _ 0

This case is possible in 4*3*2*1 = 24 ways

2) _ _ _ _ 4

This case is possible in 3*3*2*1 = 18 ways

3) _ _ _ _ 8

This case is also possible in 3*3*2*1 = 18 ways

Hence, the number of even five digit numbers that can be formed with the digits 0, 4, 5, 8 and 9 without having any repetition of digits = 24 + 18 + 18 = 60 ways

Q4 Text Solution:

The property of any even number is that the units digit of the number should be even.

This is possible in this case in the following three ways :

1) _ _ _ 0

This case is possible in 4*5*5 = 100 ways (since repetition of digits is allowed)

2) _ _ _ 4

This case is possible in 4*5*5 = 100 ways (since repetition of digits is allowed)

3) _ _ _ 8

This case is possible in 4*5*5 = 100 ways (since repetition of digits is allowed)

Hence, the number of even four digit numbers that can be formed with the digits 0, 4, 5, 8 and 9 where repetition of digits is allowed = 100 + 100 + 100 = 300 ways

Q5 Text Solution:

The property of any number divisible by four is that the number formed by the tens and units digit of the number should be divisible by four

This is possible in this case if the tens and units digit are 04, 08, 40, 48, 80 and 84.

Of the type where the tens or the units digit have a 0 in them, for example :

_ _ _ 0 4 ,

The number of such five digit numbers is 3*2*1 = 6

There are 4 such similar type.

Thus the total of all of them = 6*4 = 24

Of the type where the tens or the units digit do not have a 0 in them, for example :

_ _ _ 4 8 ,

The number of such five digit numbers is 2*2*1 = 4

There are 2 such similar type.

Thus the total of all of them = 4*2 = 8

Hence, the number of five digit numbers divisible by four that can be formed with the digits 0, 4, 5, 8 and 9 without having any repetition of digits = 24 + 8 = 32

Q6 Text Solution:

The property of any number divisible by four is that the number formed by the tens and units digit of the number should be divisible by four

This is possible in this case if the tens and units digit are 00, 04, 08, 40, 44, 48, 80, 84 and 88.

A four digit number would be of the form as given with one combination of tens and units digit :

_ _ 0 0 ,

The number of such four digit numbers is 4*5 = 20

There are 9 such similar types.

Thus the total of all of them = 20*9 = 180

Hence, the number of four digit numbers divisible by four that can be formed with the digits 0, 4, 5, 8 and 9 where repetition of digits is allowed = 180

Q7 Text Solution:

Since 5 and 8 are together, we can consider them as a single unit.

Hence the number of gaps of the five digit number is 4, and the options are now 0, 4, 9 and 58

The total possible such numbers are 3*3*2*1 = 18

But 5 and 8 could be together in 2! = 2 ways

Hence, the number of five digit numbers where 5 and 8 are together that can be formed with the digits 0, 4, 5, 8 and 9 without having any repetition of digits = 18*2 = 36 ways

Q8 Text Solution:

We know that 4*4*3*2*1 = 96 five digit numbers can be formed with the digits 0, 4, 5, 8 and 9 without having any repetition of digits

Hence, the number of five digit numbers where 5 is before 8 that can be formed with the digits 0, 4, 5, 8 and 9 without having any repetition of digits = $\frac{96}{2}$ = 48

Q9 Text Solution:

We know that 4*4*3*2*1 = 96 five digit numbers can be formed with the digits 0, 4, 5, 8 and 9 without having any repetition of digits

So, the number of five digit numbers where 5 is before 8 that can be formed with the digits 0, 4, 5, 8 and 9 without having any repetition of digits = $\frac{96}{2}$ = 48

Hence, the number of five digit numbers where 5 is before 8, and 9 is before 4, that can be formed with the digits 0, 4, 5, 8 and 9 without having any repetition of digits = $\frac{48}{2}$ = 24

Q10 Text Solution:

The word starting with H will be of the form H _ _ _ _ _ _ _ , with 7 vacancies after H

The next letters can be filled in 7*6*5*4*3*2*1 = 7! = 5040 ways

Hence, the number of distinct eight lettered English words (with or without proper meaning) starting with H that can be formed = 5040

Q11 Text Solution:

The word starting with H and ending with T will be of the form H _ _ _ _ _ _ T, with 6 vacancies in between

The other letters can be filled in 6*5*4*3*2*1 = 6! = 720 ways

Hence, the number of distinct eight lettered English words (with or without proper meaning) starting with H and ending with T that can be formed = 720

Q12 Text Solution:

The word starting with H and ending with T will be of the form H _ _ _ _ _ _ T, with 6 vacant positions between them

Since A and S will be together, we can consider them to be 1 unit.

Thus the number of vacancies will also become 5

Thus the other letters can be filled in 5*4*3*2*1 = 5! = 120 ways

But A and S can be together in 2! = 2 ways.

Hence, the number of distinct eight lettered English words (with or without proper meaning) starting with H, ending with T and having A and S together that can be formed = 120*2 = 240

Q13 Text Solution:

The word starting with H will be of the form H _ _ _ _ _ _ _ _ , with 7 vacancies after H

There are 3 vowels O, I and A.

Since they will be together, we can consider them to be 1 unit.

Thus the number of vacancies will also become 5

Thus they can be filled in 5*4*3*2*1 = 5! = 120 ways

But O, I and A can be together in 3! = 6 ways.

Hence, the number of distinct eight lettered English words (with or without proper meaning) starting with H and having all the vowels together that can be formed = 120*6 = 720

Q14 Text Solution:

In the eight lettered word ANALYSIS, there are two A's and 2 S's which are identical

Hence the number of distinct eight lettered English words (with or without proper meaning) that can be formed from the word ANALYSIS = $\frac{8!}{(2!*2!)}$ = 10080

Q15 Text Solution:

Here we need to form six digit numbers with the help of digits 2, 3, 0, 6, 8 and 9

Now, the leftmost position can never be taken by 0 and therefore the leftmost position can be filled by any the remaining digits in 5 ways.

Now, after the leftmost position is fixed, the remaining places are 5 and the remaining digits are also 5, thus they can be arranged in 5! = 120 ways.

Therefore, the total number of six digit numbers that can be formed are

5 x 120

= 600

Q16 Text Solution:

Here we are required to form 5 letter words which always begin with S and never end with T. This means that the left most position is already fixed by 'S'.

Now, there are 4 remaining positions which need to be filled by 2 O's, 1 B and 1 T.

Out of these 4 positions, T cannot take the rightmost position, therefore T can be arranged in 3 ways.

For each such position of T, the other letters i.e. 2 O's and 1 B can be arranged further in $\frac{3!}{2!}\left(as\ 'O'\ has\ been\ repeated\right)$ = 3 ways.

Therefore, the total number of such words will be

3 x 3

= 9

Q17 Text Solution:

If Sister Pooja - a nurse - is always present in the team, then it would be as if 3 members were being chosen from 5 interns and 5 nurses, a total of 10 members.

$10_{c_3} = 120$

Hence, the number of ways a team of 4 members can be created for the night shift

such that Sister Pooja - a nurse - is always present in the team = 120

Q18 Text Solution:

If Intern Manoj is never present in the team, then it would be as if 4 members were being chosen from 4 interns and 6 nurses, a total of 10 members.

$^{10}C_4$ = 210

Hence, the number of ways a team of 4 members can be created for the night shift such that Intern Manoj is never present in the team = 210

Q19 Text Solution:

Exactly one nurse can be selected from 6 nurses in $^{6}C_1$ = 6 ways

The remaining 3 team members will have to be selected from the interns in $^{5}C_3 = {}^{5}C_2$ = 10 ways

Hence, the number of ways that a team of 4 members can be created for the day shift such that there is exactly one nurse always present in the team = 6*10 = 60

Q20 Text Solution:

When the condition is that at least one nurse always present in the team, the only condition that cannot take place is that the team of 4 members constitute of only interns

The number of ways that a team of 4 members can be created for the noon shift with no conditions imposed = $^{11}C_4$ = 330

The numbers of ways that a team of 4 members can be created for the noon shift such that 4 members constitute of only interns

= $^{5}C_4$

= 5 ways

Hence, the numbers of ways that a team of 4 members can be created for the noon shift such there is at least one nurse always present in the team = 330 - 5 = 325

Q21 Text Solution:

If at least one nurse and at least two interns will always have to be present in the team, the only possibilities are :

1) 1 nurse, 3 interns :

This is possible in $^{5}C_3 * {}^{6}C_1 = {}^{5}C_2 * {}^{6}C_1$ = 10 * 6 = 60 ways

2) 2 nurses, 2 interns :

This is possible in = $^{5}C_2 * {}^{6}C_2$ = 10 * 15 = 150 ways

Hence the number of ways a team of 4 members can be created for the evening shift such there is at least one nurse and at least two interns always present in the team = 60 + 150 = 210

Q22 Text Solution:

Let us first place the 5 consonants.

This can be done in 5! ways

Let us now place the 5 vowels such that no two consonants and no two vowels are adjacent.

The only way to do this is placing 4 of the vowels in the gaps created by two consonants, and the fourth vowel either at the extreme left or the extreme right, creating two different scenarios :

V C V C V C V C V C , or, C V C V C V C V C V

Each of them can be done in 5! ways by the vowels

Hence, the number of distinct ten lettered english words that can be formed from 5 specifically given consonants and 5 vowels such that no two consonants and no two vowels are adjacent = 5! * (5! + 5!) = 120 * 240 = 28800

Q23 Text Solution:

Let us first place the 5 consonants.
This can be done in 5! ways
There are a total of 5 + 1 = 6 vacancies between and on the extreme right and left of the 5 consonants
Let us now place the 3 vowels such that no two vowels are adjacent.
That can be done by choosing any 3 out of the 6 vacancies, and placing the vowels there, and finally arranging the vowels.
This is done in 6C3 *3! = 20 * 6 = 120 ways
Hence, the number of distinct eight lettered english words that can be formed from 5 specifically given consonants and 3 specifically given vowels such that no two vowels are adjacent = 5! * 120 = 120 * 120 = 14400

Q24 Text Solution:
The number of ways in which Mr Ram can order his lunch if he wishes to have one item of each of the mocktails, starters, main courses and desserts = 4 * 6 * 11 * 3 = 792

Q25 Text Solution:
Including Mr Ram, there were 12 members in the meeting, and two members do one handshake
Hence the total number of handshakes that took place were = ${}^{12}C_2$ = 66

Q26 Text Solution:
Including Mr Ram, there were 12 members in the Diwali party, and two members exchange two distinct gifts
Hence the total number of Diwali gifts that were exchanged at the party = ${}^{12}C_2$ * 2 = 66 * 2 = 132

Q27 Text Solution:
The number of ways Mr Ram can invite 9 friends = ${}^{11}C_9 = {}^{11}C_2$ = 55 ways
The number of ways Mr Ram can invite 10 friends = ${}^{11}C_{10} = {}^{11}C_1$ = 11 ways
The number of ways Mr Ram can invite 11 friends = ${}^{11}C_{11}$ = 1 way
Hence, the number of ways Mr Ram can invite 9 or more friends at his home for dinner = 55 + 11 + 1 = 67 ways

Q28 Text Solution:
15 of the passengers have to be accommodated in the lower deck and 10 different passengers in the upper deck.
Left are 70 - (15 + 10) = 45 passengers
Out of those 45 passengers the (30 - 10 =) 20 vacancies of the upper deck have to be filled up
Can be done in $45_{C_{20}}$ ways = $\left(\frac{45!}{25!*20!}\right)$ ways
Their arrangement will be possible in 30! ways
The remaining passengers can be accommodated in the lower deck
Their arrangement can be done in 40! ways
Hence, the number of ways in which the passengers can be accommodated = $\left(\frac{45!}{25!*20!}\right)$ * 30! * 40! = $\left(\frac{45!*40!*30!}{25!*20!}\right)$

Q29 Text Solution:
A R T I C L E
1 2 3 4 5 6 7
There are three vowels A,I,E which must take even position i.e. 2nd, 4th and 6th.
so vowels take three position it means they can be arranged in ${}^3p_3$ ways
and rest 4 consonants must be take rest 4 odd position it means they can be arranged in ${}^4p_4$ ways
so required number of ways = $3_{p_3} \times 4_{p_4}$
= 6 * 24
= 144 ways
Therefore, option (C) is correct answer

Q30 Text Solution:
There are six letters in the word "MARUTI"

Now, the letters of the given word can be arranged in 6! ways which is equal to 720.
Therefore, the number of words in which "U" comes ahead of "A" will be $\frac{720}{2}$
= 360 words.