Number System - 1

1. Imagine you have 26 constants labeled A to Z. Each constant is assigned a value in the following manner:

A = 2b (2 raised to the power of the position value of B in the alphabet, i.e. 22)

B = 2c (2 raised to the power of the position value of C in the alphabet, i.e. 23)

C = 2d (2 raised to the power of the position value of D in the alphabet, i.e. 24)

And so on till Z = 2a (2 raised to the power of the position value of A in the alphabet, i.e., 21)

What is the exact numerical value of the following expression: (T – A) (T – B) ……… (T – Y) (T – Z)?

a)  b)  c)  d) None of these

1. Let x, y, z be distinct prime numbers. Which of the following statements can never be true?

a) (x – y)2 z is odd b) (x – y)(z - x)(y - z) is odd

c) (x + z) y2 is even d) (x2 – y2) z is odd

1. If , where , and x and y are both prime numbers, then the value of  is?

a) 1 b) xy c) x + y d) None of these

1. The average of N consecutive whole numbers will always be a whole number if:

a) N > 3 b) N is odd c) N is a square of whole number d) N > 5

1. A teacher writes a number on the blackboard and the students make the following observations regarding the number.
   * + - * The number is a four digit number.
         * The sum of the digits equals the product of the digits.
         * The number is divisible by the sum of the digits.

The sum of the digits of the number is:

a) 10 b) 12 c) 8 d) 14

1. In the above question, the number written by the teacher on the blackboard is?

a) 1124 b) 2224 c) 4112 d) 2242

1. A, B, C and P are distinct positive numbers, each greater than 1, and C is a prime number. Which of the following is necessarily true, if AB + C is exactly divisible by P?
   * 1. Either A or B is divisible by P.
     2. Neither A nor B is divisible by P.
     3. AB when divided by P gives a remainder of C + P.
     4. The remainder of the divisors AB/P is C more than a multiple of P.
2. A student writes the 1st 200 whole numbers side by side. How many zeros does he write in all?

a) 31 b) 29 c) 30 d) 32

1. The number of times the digit 3 will be written when listing integers from 1 to 1000 is?

a) 600 b) 400 c) 300 d) None of these

1. Find the value of the integer A, if A38144 is perfectly divisible by 11.

a) 1 b) 3 c) 5 d) 7

1. If a number 774958A96B is divisible by 72, then find the value of A and B respectively:

a) 7 and 8 b) 8 and 0 c) 5 and 8 d) None of these

1. 72 articles cost Rs. A96.7B, where A and B are the two digits. Find the cost of one such article.

a) Rs. 5.00 b) Rs. 5.11 c) Rs. 5.51 d) None of these

1. A number is formed by writing the first 24 natural numbers consecutively. What will be the remainder if this number is divided by 9?

a) 3 b) 1 c) 2 d) 7

1. A hundred digit number is formed by writing first few natural numbers in front of each other as follows: 12345678910111213141516171819………………… Find the remainder when this number is divided by 8.

a) 7 b) 1 c) 2 d) 0

1. If 39374x572 is divisible by 7, then what is the value of x?

a) 7 b) 8 c) 1 d) Either (b) or (c)

1. What will be the value of A in the number 7486A21, when it is divisible by 3?

a) 2 b) 5 c) 8 d) Any of these

1. 321 + 322 + 323 + 324 is divisible by:

a) 11 b) 14 c) 17 d) None of these

1. The natural number 1 to 20 are written side by side. What is the remainder when such a number is divided by 11?

a) 0 b) 5 c) 8 d) None of these

1. What will be the remainder when 12345678 is divided by 99?

a) 80 b) 81 c) 18 d) 9

1. What will be the remainder when 12345678 is divided by 999?

a) 36 b) 37 c) 135 d) 351

1. What will be the remainder when 45623541 is divided by 11?

a) 4 b) 7 c) 1 d) 0

1. What will be the remainder when 127896 is divided by 11?

a) 1 b) 0 c) 10 d) None of these

1. What will be the remainder obtained when (1234567890123456789)24 is divided by 6561?

a) 0 b) 1 c) 2 d) All of these

1. The sum of first 152 natural numbers is divisible by:

a) 17 b) 19 c) 9 d) All of these

1. 443 – 363 – 83 is always divisible by?

a) 19, 13 and 6 b) 11, 9 and 8 c) 17, 14 and 6 d) 17, 13 and 8

1. 2343 + 1343 is divisible by:

a) 13 b) 12 c) 11 d) 10

1. 23143 + 43143 is not divisible by:

a) 6 b) 7 c) 11 d) 33

1. 23153 + 33153 is divisible by:

a) 6 b) 7 c) 11 d) 33

1. Let n > 1, be a positive integer. Then the largest integer “m” such that (nm + 1) divides (1 + n + n2 + … + n127) is:

a) 64 b) 46 c) 68 d) 99

1. What will be the remainder obtained when (96 + 1) is divided by 8?

a) 1 b) 2 c) 3 d) 7

Number System - 2

1. Find the smallest natural number “N” such that N! is divisible by 990?

a) 11 b) 9 c) 19 d) None of these

1. Find the remainder when 1! + 2! + 3! + ………… + 100! Is divided by 15?

a) 4 b) 3 c) 6 d) 9

1. Find the last two digits of 1! + 2! + 3! + ………… + 100!

a) 23 b) 33 c) 13 d) 43

1. (1! + 2! + 3! + ………… + 26!) divided by 24 leaves a remainder

a) 0 b) 1 c) 9 d) 13

1. Find the maximum value of n if 625! is divisible by 5n.

a) 156 b) 155 c) 152 d) None of these

1. If 146! Is divisible by 6n, then the maximum value of n is:

a) 74 b) 70 c) 76 d) 75

1. If 1090! Is divisible by 990n, then the maximum value of n is:

a) 101 b) 100 c) 108 d) 109

1. If 125! Is divisible by 45n, then the maximum value of n is:

a) 28 b) 29 c) 30 d) 31

1. What is the highest power of 3, that will exactly divide 100!?

a) 28 b) 48 c) 38 d) 39

1. Find the highest power of 4 contained in 100!

a) 96 b) 48 c) 24 d) 25

1. Find the number of zeros at the end of each of the following:
2. 1 x 2 x 3 x 4 x ………. x 97 x 98 x 99 x 100
3. 2 x 4 x 6 x 8 x ………. x 94 x 96 x 98 x 100
4. 5 x 10 x 15 x 20 x 25 x ………. x 85 x 90 x 95 x 100
5. 1 x 22 x 33 x 44 x …… … .x 100100

a) 1200 b) 1300 c) 1050 d) None of these

1. 5 x 10 x 25 x 40 x 50 x 55 x 65 x 125 x 180

a) 8 b) 9 c) 12 d) 13

1. (2!)2! x (5!)5! x (6!)6! x (8!)8! x (15!)15!

a) 15! x 15! b) 5! x 5! + 15! x 15!

c) 2! + 5! + 6! + 8! + 15! d) 5! + 6! + 8! + 3 x 15!

1. Three numbers sum up to 33 whereas their squares sum up to 461. What is the value of the sum of the products of these numbers taken two at a time?

a) 214 b) 314 c) 326 d) 504

1. How many three-digit numbers have the product of their digits as a perfect square as well as perfect cube greater than 0?

a) 14 b) 13 c) 11 d) 12

1. If the square of a two – digit number (the digits are distinct) is subtracted from the square of the number formed by reversing its digits, then the absolute value of the difference is divisible by

(a) Divisible by 9 (b) Divisible by 11

(c) Both by 9 and 11 (d) Neither by 9 nor by 11

1. Find the least number which if we divide by 4851, it becomes a perfect square.

a) 11 b) 16 c) 15 d) 17

1. Find the smallest number which when added to 3998 gives a perfect square.

a) 96 b) 98 c) 97 d) 99

1. If “N” is a square, then N2 cannot end in:

a) 6 b) 5 c) 8 d) None of these

1. The sum of 13 + 23 + 33 + …………… + n3 is:
   * 1. The perfect square of an odd number.
     2. The perfect square of an even number.
     3. The perfect square of a natural number.
     4. The perfect cube of a natural number.
2. If the sum of two numbers be multiplied by each separately, the products so obtained are 2418 and 3666. Find the numbers.

a) 31, 41 b) 35, 41 c) 31, 47 d) 35, 47

1. A bus number had a certain peculiarity about it. The number plate showed the bus number was a perfect square and also if the plate was turned upside down, the number would still be perfect square. The bus company had only five hundred buses numbered from 1 to 500. What was the number?

a) 36 b) 196 c) 169 d) Can’t Say.

1. Some packets of chalk are kept in a box in the form of a cube. If the total number of packets is 2197, find the number of rows of the packets in each layer.

a) 16 b) 13 c) 23 d) None of these

1. M is a single digit integer satisfying the following conditions:
   * + - M is non-zero
       - M is the right most digit of the number , where n is a natural number greater than 1.

What is the number of possible values of M?

a) 1 b) 2 c) 3 d) None of these

1. If in the above question, the condition that M is a non zero integer is relaxed, then the number of possible values of M is:

a) 1 b) 2 c) 3 d) None of these

Number System - 3

1. Find the H.C.F. and the L.C.M. of 14xy3, 22x2y , 26x3y4
2. Find the H.C.F. and the L.C.M. of 8x2 (x – 1)2 (x + 1) and 6xy (x + 1)2 (x –1)
3. The greatest number that will divide 132, 100 and 36 leaving the same remainder in each case is:

a) 8 b) 24 c) 32 d) 64

1. Find the largest number that will divide 171, 333 and 576 to leave exactly the same remainder in each case.

a) 9 b) 162 c) 27 d) 81

1. Find the greatest number that will divide 887 and 1061 leaving remainders 7 and 5 respectively.

a) 32 b) 16 c) 176 d) 18

1. A number when divided by 562 leaves a remainder 13. What will be the remainder when the sane is divided by 11?

a) 0 b) 1 c) 2 d) None of these

1. A number when divided by a certain divisor leaves a remainder 17. If five times the number is divided by the same divisor, the remainder is 28. Then the divisor is

a) 19 b) 38 c) 57 d) 76

1. A number x on dividing by 11 gives the same quotient as the number y on dividing by 17. In the former case the remainder is 2 and in the later case the remainder is 3. What can be the value of y – x?

a) 3 b) 2 c) 7 d) 11

1. Find the number which when divide by 2,3,4,5,6,7,8,9 leave the remainder 1,2,3,4,5,6,7,8 respectively. It is known that the number lies between 5000 and 6000.

a) 5038 b) 5039 c) 5040 d) 5041

1. Find the least number which when divided by 16, 18 and 20 leaves remainders 7, 9 and 11 respectively.

a) 351 b) 369 c) 711 d) None of these

1. A number is divided by 20,25,30,36 and 48. The respective remainders obtained are found to be 15, 20, 25, 31 and 43. Find the least such number

a) 3600 b) 3605 c) 3595 d) None of these

## Directions for Question Number 12 and 13

A number is divided by 5,7 and 9. The remainder in respective cases are found to be 1, 2 and 3. With the given information answer the following questions:

1. Find the least such number

a) 331 b) 471 c) 156 d) 786

1. Find the greatest 3 digit such number

a) 331 b) 471 c) 156 d) 786

1. What is the least number of soldiers that can be drawn up in troops of 12, 18, 42 and 54 soldiers, and also in the form of a solid square?

a) 756 b) 15876 c) 15786 d) None of these

1. Find the least number which when divided by 16, 18 and 20 leaves a remainder 1 in each case.

a) 359 b) 361 c) 719 d) 721

1. A number when successively divided by 5 and 7, leaves remainders 3 and 5. When the same number is divided by 35, the remainder is:

a) 1 b) 2 c) 5 d) None of these

1. A number being successively divided by 5, 7 and 9 leaves 2, 4 and 6 as remainders respectively. If the order of the divisors is reversed then the remainders will be:

a) 2, 4 , 6 b) 6, 4 , 2 c) 7, 4, 3 d) 3, 4, 7

1. A number being successively divided by 7, 8 and 9 leaves 3, 4 and 5 as remainder. If the number is successively is divided by 36, 7, 4 the remainder would be:

a) 4,5,2 b) 2,4,5 c) 5,2,4 d) Can’t be determined

1. A number when divided by 2, 3, 4, 5 and 6 leaves 1 as the remainder but is perfectly divisible by 7. What is the minimum possible number?

a) 1981 b) 1561 c) 1141 d) None of these

1. A number when divided by 5, 7 and 9 leaves 3 as the remainder but is perfectly divisible by 11. What is the minimum possible number?

a) 6303 b) 6308 c) 3063 d) None of these

1. Two numbers 2270 and 3142 when divided by a 3–digit number individually leave the same remainder. What is the least possible 3–digit number satisfying the above condition?

a) 218 b) 436 c) 872 (d) None of these

1. Find the greatest number that will divide 114, 148 and 182 leaving remainder 2, 4 and 6 respectively

a) 32 b) 16 c) 8 d) 28

1. How many 2 digit numbers are exactly seven times the sum of their digits?

a) 3 b) 4 c) 5 d) 6

1. Which of the following is/are false?
2. If the numbers are prime to each other than their HCF is unity
3. It is not possible to divide 1000 into two parts such that their HCF may be 15
4. LCM of a set of numbers is necessarily greater than the largest number in that set.
5. HCF of a set of numbers can be equal to the smallest number in that set.
6. The HCF of a, b and c is H. a, b and c are therefore multiples of H.
7. The LCM of a, b and c is L. a, b and c are therefore factors of L.
8. Find the sum of the numbers between 301 and 401 such that when they are divided by 6, 9 and 12.
   * 1. Leaves no remainder
     2. Leaves remainder 4 in each case
9. Find the greatest number of six digits which on being divided by 6,7,8,9 and 10 leaves 4, 5, 6, 7, and 8 as remainder respectively.

a) 999999 b) 997920 c) 997918 d) 997922

1. Find the least number which when doubled will be exactly divisible by 68, 102, 117 and 78.

a) 3878 b) 3988 c) 3978 d) None of these

1. Find the number of pairs of natural numbers with LCM as 56.

a) 16 b) 11 c) 8 d) 10

1. A and B are two natural numbers such that their GCD is same as their LCM, then which of the following is necessarily true?

a) A = B = 1 b) A = B c) A B d) None of these

1. The ten-digit number 9793a6160b is divisible by 11. If 0 < a < b, find the sum of remainders when the number is divided by a + b and a successively.

a) 7 b) 9 c) 3 d) 2

Number System - 4

1. Let M be a positive integer. Now consider all numbers of the form 32M+1 + 22M+1. Which of the following statement is true regarding the last digit of these numbers?
   * + 1. It is 5 for some of these numbers but not for all.
       2. It is five for all these numbers.
       3. It is always 5 or M 10 and 5 for some M > 10.
       4. It is odd for all of these numbers but not necessarily 5.

**For Q. No. 2 to 20, find the digit in the unit’s place:**

1. (7)71
2. (13)13
3. 3564328161
4. (2967)321
5. (7.4)48
6. 65978 – 25213
7. 343173 x 649201
8. 3453768 x 3567558
9. 11 + 22 + 33 + ……… + 1010
10. 36723 + 47976 + 69390 + 1236566 + 747748906
11. 55556666 + 66665555 – 11115656
12. 5566786 x 784343 x 976944 x 464738 x 377823437
13. 11 x 22 x 33 x ……… x 1010
14. 11 x 22 x 33 x 44 x 66 x 77 x 88 x 99
15. 111 x 122 x 133 x 144 x 155 x 166 x 177 x 188 x 199
16. 111 x 122 x 133 x 144 x 166 x 177 x 188 x 199
17. 1! + 2! + 3! + 4! + …………… + 97! + 98! + 99!
18. (123123 + 456456 + 789789) – (123 + 456 + 789)
19. 41.42.43.44…………4987
20. If x is a single digit natural number, find the digit at the unit’s place of x5?

a) 1 b) x2 c) x – 1 d) x itself

1. The digit in the unit place of (33)4N + 1, where N is any natural number is:

a) 2 b) 4 c) 1 d) None of these

1. The unit’s digit of 11! + 22! + 33! + 44! + …………… + 8080! is:

a) 0 b) 3 c) 5 d) 6

1. The last digit of the LCM of () and () is:

a) 5 b) 9 c) 4 d) 1

1. What will be the unit digit of 6191 + 345201 – 17646 ?

a) 6 b) 0 c) 4 d) 2

1. The digit in the unit place of 348971 + 26412N+3, where n is a natural number is:

a) 6 b) 0 c) 4 d) 2

1. On simplification, the expression 822 + 823 + 824 + 825 to a whole number, the number of zeros at the end of the whole number will be:

a) 1 b) 2 c) 3 d) None of these

1. The digit at the unit place of is:

a) 5 b) 9 c) 4 d) 1

1. The digit at the unit place of 65978 – 25213 is:

a) 0 b) 9 c) 4 d) 1

1. Find the digit at the unit place in the expansion of .

a) 2 b) 6 c) 4 d) 8

1. Find the digit at the unit place in the expansion of .

a) 2 b) 6 c) 4 d) 8

1. Find the digit at the unit place in the expansion of .

a) 2 b) 6 c) 4 d) 8

1. On simplification, what will be the end digit of: ?

a) 0 b) 5 c) 3 d) 1

1. What will be the 2nd last digit in the expansion of 215215?

a) 0 b) 7 c) 2 d) 1

1. What will be the 2nd last digit in the expansion of 46073575?

a) 0 b) 4 c) 9 d) 3

1. What are the last two digits in the expansion of 36726?

a) 96 b) 36 c) 56 d) 16

1. What are the last two digits in the expansion of 715315?

a) 75 b) 15 c) 25 d) None of these

Number System - 5

1. Find the smallest 3-digit number, which divides 1987 and 999 leaving remainders of 7 and 9 respectively.

a) 100 b) 110 c) 156 d) 330

1. The remainder of the square of any prime number greater than 5 when divided by 24 is:

a) Always 3 b) Always 2 c) Always 1 d) Either 2 or 3

1. When prime number N is divided by another prime number D, prime numbers Q and R are the quotient and remainder respectively. Find the least possible value of N, if Q < D.

a) 12 b) 14 c) 13 d) 17

1. What is the least 5-digit number, which when divided by 8 or 9 leave a remainder of 3 in each case?

a) 10110 b) 10011 c) 10008 d) 10801

**For Q. No. 5 to 30, find the remainder when:**

1. 7100 is divided by 6

a) 3 b) 1 c) 2 d) None of these

1. 21000 is divided by 5

a) 3 b) 1 c) 2 d) None of these

1. 293 is divided by 9

a) 1 b) 8 c) 6 d) None of these

1. 294 is divided by 9

a) 1 b) 8 c) 7 d) None of these

1. 787 is divided by 344

a) 1 b) 343 c) 2 d) None of these

1. 16200 is divided by 511

a) 256 b) 2 c) 509 d) None of these

1. 566 is divided by 127

a) 2 b) 7 c) 9 d) None of these

1. 739 is divided by 35

a) 0 b) 2 c) 4 d) None of these

1. 5127 is divided by 124

a) 5 b) 2 c) 9 d) None of these

1. 317 is divided by 79

a) 9 b) 0 c) 48 d) None of these

1. 789 is divided by 50

a) 1 b) 7 c) 0 d) None of these

1. 59 is divided by 27

a) 1 b) 25 c) 26 d) None of these

1. 620 is divided by 20

a) 1 b) 0 c) 16 d) None of these

1. 365 is divided by 28

a) 19 b) 27 c) 9 d) None of these

1. 5124 is divided by 124

a) 0 b) 5 c) 2 d) None of these

1. 5124 is divided by 126

a) 121 b) 120 c) 20 d) None of these

1. 9100 is divided by 8

a) 3 b) 1 c) 2 d) None of these

1. 173 + 63 + 25 is divided by 23

a) 3 b) 1 c) 2 d) None of these

1. 43101 + 23101 divided by 66

a) 0 b) 2 c) 3 d) None of these

1. 822 is divided by 23

a) 3 b) 1 c) 2 d) None of these

1. 3536 is divided by 37

a) 3 b) 1 c) 0 d) None of these

1. 9696 is divided by 97

a) 1 b) 2 c) 96 d) None of these

1. (66 x 67 x 68) is divided by 31

a) 27 b) 2 c) 29 d) None of these

1. (66 x 67 x 68) is divided by 69

a) 1 b) 63 c) 9 d) None of these

1. (1537 x 1539 x 1541) is divided by 17

a) 13 b) 27 c) 9 d) None of these

1. 2851 x (2862)2 x (2873)3 is divided by 23

a) 18 b) 21 c) 9 d) None of these

1. A 50-digit number has all 7’s. Find the remainder when the number is divided by 74.

a) 23 b) 13 c) 3 d) 33

1. Let N = (7777……101 digits). When N is divided by 440, the remainder would be?

a) 139 b) 338 c) 337 d) None of these

1. Let N = (1!)3 + (2!)3 + (3!)3 + (4!)3 + (5!)3 + (6!)3 + (7!)3 . Find the remainder when N is divided by 5.

a) 4 b) 3 c) 2 d) 1

1. What is the remainder when is divided by 13?

a) 11 b) 2 c) 12 d) 1

1. What is the remainder if (1237 x 1239 x 1241 x 1243) is divided by 30?

a) 12 b) 14 c) 9 d) 1

Number System - 6

1. Find the number of whole numbers less than 100 such that the sum of the factorials of the digit(s) is less than or equal to the number.

a) 20 b) 17 c) 18 d) 19

1. Let M = Q100 x 100!, where Q is a prime number. Find the maximum number of zeros that M can have at the end of the product?

a) 94 b) 97 c) 128 d) None of these

Let f(n) denotes the number of positive divisors of n; g(n) denotes the number of positive divisors of n not including unity and are less than n and s(n) denotes the sum of all the divisors of n, then find the followings:

1. f(51)

a) 4 b) 7 c) 2 d) None of these

1. f(49)

a) 4 b) 3 c) 5 d) None of these

1. f(72)

a) 10 b) 11 c) 12 d) None of these

1. f(225)

a) 9 b) 7 c) 10 d) None of these

1. f(2048)

a) 14 b) 10 c) 11 d) None of these

1. g(49)

a) 3 b) 1 c) 2 d) 4

1. g(51)

a) 4 b) 7 c) 2 d) None of these

1. g(72)

a) 10 b) 11 c) 12 d) 14

1. g(100)

a) 9 b) 10 c) 8 d) None of these

1. g(225)

a) 9 b) 7 c) 10 d) 8

1. g(2048)

a) 14 b) 10 c) 11 d) 12

1. s(49)

a) 67 b) 47 c) 57 d) 77

1. s(2048)

a) 1495 b) 4010 c) 4095 d) 4100

1. s(72)

a) 145 b) 195 c) 215 d) 200

1. s(51)

a) 144 b) 36 c) 72 d) None of these

1. s(225)

a) 304 b) 403 c) 430 d) 340

1. s(100)

a) 217 b) 712 c) 271 d) None of these

1. The number of ways 36 can be expressed as a product of two factors is:

a) 6 b) 5 c) 6 d) 4

1. The number of ways 36 can be expressed as a product of two different factors of 36 are:

a) 3 b) 1 c) 4 d) 5

1. In how many ways can you write 7056 as a product of 2 different factors?

a) 23 b) 11 c) 22 d) 20

1. In how many ways 120 be expressed as a product of 2 co-prime factors?

a) 3 b) 2 c) 4 d) None of these

1. In how many ways 21600 can be expressed as a product of two co-prime factors?

a) 5 b) 4 c) 3 d) None of these

1. Let N is a natural number. Number of factors of N = 720. Find the maximum number of prime factors that N can have.

a) 7 b) 6 c) 10 d) 5

1. Find how many positive integers I exist such that (I + 1)(I + 2)(I + 3) is perfectly divisible by I?

a) 2 b) 1 c) 0 d) 3

1. Find how many positive integers M exist such that (M + 2)(M + 3)(M + 4)(M + 1) is perfectly divisible by M?

a) 6 b) 7 c) 8 d) 9

1. How many numbers upto 40 are co-primes to 40?

a) 16 b) 13 c) 12 d) 21

1. How many natural numbers are there which are less than 48 and co-prime to 48?

a) 15 b) 12 c) 16 d) None of these

1. A very long hallway has 1000 doors numbered 1 to 1000; all doors are initially closed. One by one, 1000 people get into the hall; the first person opens each door, the second closes all door with even numbers, the third person closes door 3, opens door 6, closes door 9, opens door 12 etc. That is, the nth person changes all doors whose numbers are divisible by n. After all 1000 people have got into the hall, find out the doors which are open.
   * 1. Doors whose numbers are prime numbers.
     2. All doors will be closed.
     3. Doors whose numbers are perfect squares.
     4. Only the last door is open.

Number System - 7

1. The binary equivalent of the decimal number 186 is:

a) 10111010 b) 10111101 c) 10101010 d) 1001101

1. What is (101) + (111) + (001) in binary system?

a) 1110 b) 1101 c) 1001 d) None of these

1. Subtract 11010 from 110011.

a) 10110 b) 11011 c) 11001 d) None of these

1. The octal equivalent of the decimal number 1277 is:

a) 2375 b) 2475 c) 2355 d) None of these

1. The hexadecimal equivalent of the number 55276 in decimal system is?

a) CE22 b) D8EC c) E7EC d) D7EC

1. The hexadecimal equivalent to the octal number 1752 is:

a) 3AE b) 5BA c) 5CA d) 3EA

1. Find the value of (2313)4 + (1230)4.

a) (0100100011)2 b) (10202)4 c) (10201)4 d) (0100100010)2

1. Find the value of (10232)4 + (110101)2 + (654)8.

a) (30F)16 b) (1417)8 c) (30033)4 d) Both (b) & (c)

1. Find k where (524)8 = (664)k.

a) 5 b) 7 c) 6 d) 9

1. If (3M3)6 + (44M)6 = (1242)6, what is M?

a) 4 b) 5 c) 3 d) 2

1. What is the conversion of 24 in base 8 to base 2?

a) 10101 b) 10010 c) 10001 d) 10100

1. If 25 is written as 100 in some number system, how will 24 be written as in the same number system?

a) 77 b) 44 c) 33 d) None of these

1. Convert (100100)3 to base 27.

a) 11 b) 99 c) 10 d) 19

1. If (6)k + (6)k = (14)k, then find the value of k.

a) 7 b) 6 c) 8 d) Can’t be determined

1. In which scale 1331 is a perfect cube?

a) 4 b) 6 c) 5 d) All of these

1. Moizen converted 219 (in decimal system) to base system of 4. How many consecutive zeros did he write in all?

a) 14 times b) 9 times c) 10 times d) 3 times

1. What is the remainder when (12345678)15 is divided by 715?

a) 3 b) 8 c) 6 d) None of these

1. Given that 2100! = (504)P Q, where P and Q are natural numbers and Q is not a multiple of 7. What is the value of P?

a) 348 b) 698 c) 364 d) 522

1. How many digits are required o write the numbers between 1 to 200?

a) 496 b) 480 c) 492 d) None of these

1. If 10022 – 22 is written in decimal notation, the sum of digits in the number is:

a) 390 b) 393 c) 658 d) 493

1. M is product of first 41 natural numbers. Let us define Z = M + 1. The number of primes among (Z + 1), (Z + 2), (Z + 3), …, (Z + 38), (Z + 39), (Z + 40) is

a) 0 b) 1 c) 2 d) None of these

1. 461 + 462 + 463 + 464 + 465 is divisible by:

a) 3 b) 11 c) 5 d) 17

1. Let I be the set on integers {2, 12, 22, 32, ……………, 542, 552} and Y be a subset of I such that the sum of no two elements of Y is divisible by 3. The maximum possible number of elements in Y is:

a) 19 b) 20 c) 18 d) 21

1. If x and y are positive integers, x > y and 3x + 2y & 2x + 3y when divided by 5, leave remainders 2 and 3 respectively. It follows that when x – y is divided by 5, the remainder necessarily equals:

a) 3 b) 4 c) 1 d) 4

1. The product of the HCF and LCM of two distinct natural numbers is 37. In another set of two numbers the HCF and LCM are equal. However, none of the numbers are the squares or cubes of any natural number. Which among the following is the sum of the sum of numbers in the first set and the product of the two numbers in the second set?

a) 39 b) 42 c) 45 d) 64

Number System - 8

1. M, N, O are consecutive integers. Which of the following is true?
   * 1. M + N + O is always even.
     2. M + 2N + O is always even.
     3. M + N + O is always odd.
     4. M + 2N + O is always odd.
2. If r, s, t are consecutive odd integers, with r < s < t, which of the following must be true?
   * 1. rs = t
     2. r + t = 2t – s
     3. r + t = 2s
     4. r + s = t + 2
3. If n is any integer, which of the following is true?
   * 1. 3n + 1 is odd.
     2. n(n + 2) is even.
     3. n(3n + 3) is divisible by 6.
     4. n(n + 1) is divisible by 3.
4. If a, b, c are three natural numbers such that c is a factor of the product ab and c is co-prime to a, then:
   * 1. b is a factor of c.
     2. a is a factor of b.
     3. c is a factor of b.
     4. b is a factor of a.
5. The number 98765432 is divisible by:

a) 6 b) 8 c) 3 d) None of these

1. The greatest four digit number divisible by 77 is:

a) 9966 b) 9988 c) 9933 d) 9921

1. If k = , then which of the following gives the value of k?

a) 10403 b) 10304 c) 10302 d) 10203

1. What is the sum of all 2-digit numbers which leave a remainder of 6 when divided by 8?

a) 594 b) 495 c) 954 d) None of these

1. Moizen took a 4-digit number in base 5 notation. Then he subtracted the sum of the digits of the number from the number. From the result, he struck off one of the digits. The remaining 3 digits were 1, 0 and 2. Then the digit struck off by Moizen was:

a) 4 b) 2 c) 1 d) Can’t be determined

1. Which of the following is the product of 4312563 and 284276?

a) 122766054388 b) 1227866055388 c) 123667055688 d) 1225958159388

1. A four-digit number when successively divided by 6, 8 and 9 leave remainders of 3, 2 and 1 respectively. What could be the remainder when the number is divided by 108?

a) Only 99 b) Only 63 c) Only 27 d) Either 99 or 63 or 27

1. Given x is a natural number, and y is a whole number less than 10. Which of the following expressions is of the form 37k, where k is an integer, if (10x + y) is divisible by 37?

a) x + 11y b) x + 8y c) x – 11y d) x – 8y

1. Find the number of three-digit numbers which when divided by 7 and 5 leave a remainder of 2 in each case.

a) 25 b) 26 c) 27 d) 28

1. The square of the two-digit number ab is equal to the three-digit number ccb, where a, b, c are three distinct digits. Which of the following statements are always true?
   1. If a < b, then c = 2
   2. If b < c, then a = 2
   3. If c > a, then b = 1

a) II and II b) I, II and III c) I and II d) III only

1. Which of the following numbers can be expressed as the sum of two perfect squares such that the sum of the squares of the two digits of the number equals the number formed by reversing the digits of one of the perfect squares?

a) 65 b) 85 c) 73 d) 82

1. Let Sm be the sum of the first m digits of the sequence of natural numbers 12345678…….. What is the minimum value of m, if Sm is divisible by 25?

a) 19 b) 17 c) 7 d) 29

1. A student wrote all the natural numbers from 2 to 10000 on a blackboard, one after the another. Another student came and erased all the perfect squares. Another student came and erased all the perfect cubes. If students come this way and erase all the higher powers, find the number of students who erase at least one number.

a) 8 b) 7 c) 6 d) None of these

1. A number when successively divided by 8, 7 and 6 leaves respective remainder of 6, 5 and 5. Find the remainder when the number is divided by 52.

a) 12 b) 14 c) 16 d) Can’t be determined

1. Moizen writes the number 458 on the blackboard, after which each one of his friends walks up to the board and is allowed to perform exactly one operation. The operation can be either to double the number on the board (after erasing the earlier number) or to erase the last digit of the number on the board. If after sometime number 14 was on the board, then what is the minimum possible number of friends that Moizen has? Assume that no friend walks up to the board twice.

a) 4 b) 6 c) 8 d) None of these

1. A number when divided by 4, 5, 6 and 7 leaves a remainder of 2, 3, 4 and 5 respectively. What is the largest such number less than 3000?

a) 2983 b) 2938 c) 2893 d) 2839

1. If P is an integer such that 6 P  N, N being a positive integer, and P and (P – 6) are the only factors of N, which of the following statements is true?
   1. N + 1 is odd.
   2. N is prime.
   3. (N + 9) is a perfect square.

a) Only II b) Only III c) Both II and III d) I, II and III

1. Moizen was asked by his mathematics teacher to write an algebraic expression on the blackboard by using exactly five 2’s, such that the expression evaluates to 10. However, he is allowed to use only the operations of multiplication and addition, along with parenthesis and exponentiation (i.e., raising to the power). If Moizen writes all such expressions possible, then how many expressions does he write?

a) 8 b) 4 c) 6 d) 5

1. In the above problem, what is the total number of expressions that Moizen can write, if he is allowed to used the operation of division also?

a) 9 b) 10 c) 11 d) 12

1. A teacher asked two students to add some consecutive natural numbers starting from 1. The two students, Moi and Zen added a different number of numbers but both of them missed the same number during the addition process. They ended up with a sum greater than 1300 and less than 1360. How many values are definitely possible for the numbers missed by them?

a) 10 b) 7 c) 9 d) 8

1. There are four numbers written in a row in ascending order. The average of all possible triplets of the four numbers in this row are now written in the ascending order in a second row. This process is repeated for the second row, and then for the subsequent rows. If in the first row, the difference of the first and the fourth numbers is 27 and that of the second and the third numbers is 8, the difference between the first and fourth number of the tenth row is closet to, which of the following?

a) 0.1 b) 0.01 c) 0.001 d) Can’t be determined