Number System Practice Questions

Q1. If a, b, c and d are prime numbers such that $1 < a < b < c < d$ and $abcd = 1430$, then what is the value of d?

A) 3
B) 9
C) 11
D) 13
E) 22

Q2. What is the least positive integer that is divisible by each of the integers 1 through 7, inclusive?

A) 420
B) 840
C) 1260
D) 2520
E) 5040

Q3. If x is equal to the sum of even integers from 40 to 60 inclusive and y is the number of even integers from 40 to 60 inclusive. What is the value of x + y?

A) 550
B) 551
C) 560
D) 561
E) 572

Q4. If S is a set of four numbers w, x, y and z. Is the range of the numbers in S greater than 2?

1) $w - z > 2$
2) z is the least number in S

Q5. If a, b and c are integers, is the number $3(a + b) + c$ divisible by 3?

1) a + b is divisible by 3
2) c is divisible by 3

Q6. Is x an even integer?

1) x is the square of an integer
2) x is the cube of an integer

Q7. If x and y are the integers between 10 and 99, inclusive. Is $\frac{x-y}{9}$ an integer?

1) x and y have the same two digits, but in reverse order.
2) The tens digit of x is 2 more than the units digit and the tens digit of y is 2 less than the units digit.

Q8. How many distinct prime factors does $5^{40} + 5^{37}$ have?

A) 1
B) 2
C) 3
D) 4
E) 5

Q9. If r, s and t are consecutive integers, what is the greatest prime factor of $3^r + 3^s + 3^t$?

A) 3
B) 5
C) 7
D) 11
E) 13

Q10. What is the sum of digits of the number $10^{50} - 74$?

A) 9
B) 18
C) 27
D) 36
E) 440

Q11. If x, y and z are positive integers such that 'x' is a factor of' y' and x is a multiple of 'z'. Which of the following is NOT necessarily an integer?

A) $\frac{x+z}{z}$

B) $\frac{y+z}{x}$

C) $\frac{x+y}{z}$

D) $\frac{xy}{z}$

E) $\frac{yz}{x}$

Q12. Is the integer z divisible by 6?

1) The greatest common factor of z and 12 is 3.
2) The greatest common factor of z and 15 is 15.

Q13. If x and y are perfect squares, then which of the following is not necessarily a perfect square?

A) x^2
B) xy
C) 4x
D) x +y
E) x^5

Q14. If p and q are positive integers, how many integers are larger than pq and smaller than p(q + 2)?

A) 3
B) P + 2
C) p – 2
D) 2p – 1
E) 2p + 1

Q15. If x > y > 0, which of the following must be true?

I. $\frac{x+1}{y+1} > \frac{x}{y}$

II. $\frac{x+1}{y+1} = \frac{x}{y}$

III. $\frac{x+1}{y+1} > 1$

A) I only
B) II only
C) III only
D) I and II only
E) II and III only

Q16. If 2 is the greatest number that will divide evenly into both x and y, what is the greatest number that will divide evenly into both 5x and 5y?

A) 2
B) 4
C) 6
D) 8
E) 10

Q17. If p divided by 9 leaves a remainder of 1, which of the following must be true?

I. p is even
II. p is odd
III. p = 3z + 1, for some integer z

A) I only
B) II only
C) III only
D) I and II only
E) None of the above

Q18. If the sum of two prime numbers x and y is odd, then the product of x and y must be divisible by

A) 2
B) 3
C) 4
D) 5
E) 8

Q19. If $\frac{x+y}{x-y} = 3$ and x and y are integers, then which one of the following must be true?

A) x is divisible by 4
B) y is odd
C) y is even
D) x is even
E) x is irreducible fraction

Q20. If y is an odd integer and the product of x and y equals 222, what is the value of x?

1) x is a prime number
2) y is a three digit number

Q21. If x and y are prime numbers such that $x > y > 2$, then $x^2 - y^2$ must be divisible by which one of the following numbers?

A) 3
B) 4
C) 5
D) 9
E) 12

Q22. If the positive integer N is a perfect square, which of the following must be true?

I. Number of distinct factors of N is odd
II. Sum of distinct factors of N is odd
III. The number of distinct prime factors of N is even

A) I only
B) II only
C) I and II only
D) I and III only
E) I, II and III

Q23. In a certain game, a large bag is filled with blue, green, purple and red chips worth 1, 5, x and 11 points each, respectively. The purple chips are worth more than the green chips but less than the red chips. A certain number of chips are then selected from the bag. If the product of the point values of selected chips is 88,000, how many purple chips were selected?

A) 1
B) 2
C) 3
D) 4
E) 5

Q24. Is the positive integer x a perfect square?

1) The number of distinct factors of x is even
2) The sum of all distinct factors of x is even

Q25. Let a = sum of integers from 1 to 20 and b = sum of integers from 21 to 40. What is the value of b – a ?

A) 21
B) 39
C) 200
D) 320
E) 400

Q26. Does x – y = 0?

1) $\frac{x}{y} > 0$
2) $x^2 = y^2$

Q27. If p and q are integers, is pq + 1 even?

1) If p is divided by 2, the remainder is 1
2) If q is divided by 6, the remainder is 1

Q28. S is a set of integers such that

I. If x is in S, then –x is in S
II. If both x and y are in S, then so is x + y.

Is -2 in S?

1) 1 is in S
2) 0 is in S

Q29. A botanist select n^2 trees on an island and studies (2n + 1) trees everyday where n is an even integer. He does not study the same tree twice. Which of the following cannot be the number of trees that he studies on the last day?

A) 13
B) 17
C) 28
D) 31
E) 79

Q30. If x = 2891 × 2892 × 2893 ×……..× 2898 × 2899 × 2900, the what is the remainder when x is divided by 17?

A) 0
B) 4
C) 7
D) 10
E) 14

Q31. For every positive integer n, the function h(n) is defined to be the product of all the even integers from 2 to n, inclusive. If p is the smallest factor of h(100) + 1, then p is

A) Between 2 and 10
B) Between 11 and 20
C) Between 21 and 30
D) Between 31 and 40
E) Greater than 40

Q32. If the sum of five consecutive positive integers is A, then the sum of the next five consecutive integers in terms of A is

A) A + 1
B) A + 5
C) A + 25
D) 2A
E) 5A

Q33. A, B, C and D are all different digits between 0 and 9. If AB + DC = 7B (AB, DC and 7B are two digit numbers), what is the value of C?

A) 0
B) 1
C) 2
D) 3
E) 5

Q34. If $2x < y$ and $2x^2 > xy$, which of the following must be true?

A) $x > 1$
B) $x < 0$
C) $x > 0$
D) $y < 0$
E) $y > 1$

Q35. If x and y are different positive integers and 3x + y = 14, what is the product of all the possible values of x?

A) 6
B) 8
C) 14
D) 20
E) 24

Q36. If x is an integer and $\left(\sqrt{x} \times x\right) - x = a$, which of the following must be true?

I. a is even
II. a is positive
III. a is an integer

A) I only
B) II only
C) III only
D) I and II only
E) None of the above

Q37. Which of the following expressions has the greatest value? (numbers)(650-750)

A) $\frac{1876452}{1876455}$
B) $\frac{1883446}{1883449}$
C) $\frac{1883453}{1883456}$
D) $\frac{1883456}{1883459}$
E) $\frac{1883491}{1883494}$

Q38. If 'm' and 'n' are integers then what is the smallest possible value of integer m such that $\frac{m}{n} = 0.3636363636\ldots\ldots$?

A) 3
B) 4
C) 7
D) 13
E) 22

Q39. If N = 1234@ and @ represents the units digit. Is N a multiple of 5? (numbers)(600-700)

1) @! is not divisible by 5
2) @ is divisible by 9

Q40. If (|p|!)p = |p|!, which of the following could be the value(s) of p?

A) -1
B) 0
C) 1
D) -1 and 1
E) -1, 0 and 1

Q41. If 5x = y +7, is (x – y) > 0?

1) xy = 6
2) x and y are consecutive integers with the same sign

Q42. If 's' and 't' are positive integer such that $\frac{s}{t} =$ 64.12, which of the following could be the remainder when 's' is divided by 't'?

A) 2
B) 4
C) 8
D) 20
E) 45

Q43. If 'x' is positive, which of the following could be the correct ordering of $\frac{1}{x}$, 2x and x^2?

I. $x^2 < 2x < \frac{1}{x}$

II. $x^2 < \frac{1}{x} < 2x$

III. $2x < x^2 < \frac{1}{x}$

A) None of the above
B) I only
C) III only
D) I and II only
E) II and III only

Q44. If p is a prime number greater than 2, what is the value of p?

1) There are total of 100 prime numbers between 1 and p + 1.
2) There are a total of 'p' prime numbers between 1 and 3912

Q45. If a, b and c are positive integers and are assembled into the six digit number abcabc, which of the following must be a factor of abcabc?

A) 16
B) 13
C) 5
D) 3
E) None of the above

Q46. What is the remainder when $1^1 + 2^2 + 3^3 + \ldots\ldots\ldots\ldots + 10^{10}$ is divided by 5?

A) 0
B) 1
C) 2
D) 3
E) 4

Q47. If Q and T are integers, what is the value of Q?

1) $Q = \frac{2T}{7}$
2) $\frac{T + 7}{2} = \frac{7(Q + 2)}{4}$

Q48. If 'm' and 'n' are integers and $\sqrt{mn} = 10$, which of the following cannot be a value of m + n?

A) 25
B) 29
C) 50
D) 52
E) 101

Q49. The three digits of a number add upto 11. The number is divisible by 5. The leftmost digit is double the middle digit. What is the product of the three digits?

A) 40
B) 72
C) 78
D) 88
E) 125

Q50. If $x = y + y^2$ and y is a negative integer, when y decreases in value, then x

A) Increases in value
B) Fluctuates
C) Decreases in value
D) Remains the same
E) Decreases in constant increments

Q51. If w, x, y and z are the digits of the four digit number N, a positive integer, what is the remainder when N is divided by 9?

1) $w + x + y + z = 13$
2) $N + 5$ is divisible by 9

Q52. If both 'x' and 'y' are positive integers less than 100 and greater than 10, is the sum 'x + y' a multiple of 11?

1) $(x - y)$ is a multiple of 22
2) The tens digit and the units digit of 'x' are the same; the tens digit and units digit of 'y' are the same

Q53. Susie can buy apples from two stores: a supermarket that sells apples only in bundles of 4 and a convience store that sells single, unbundled apples. If Susie wants to ensure that the total number of apples she buys is a multiple of 5, then what is the minimum number of apples she must buy from the convience store?

A) 0
B) 1
C) 2
D) 3
E) 4

Q54. 'x' is the sum of 'y' consecutive integers, 'w' is the sum of 'z' consecutive integers. If $y = 2z$, and y and z are both positive integers, then each of the following could be true EXCEPT

A) $x = w$
B) $x > w$
C) (x/y) is an integer
D) (w/z) is an integer
E) (x/z) is an integer

Q55. If 'x' is a positive integer, is 'x' prime? (prime numbers) (700-800)

1) 'x' has the same number of factors as y^2, where y is a positive integer greater than 2
2) 'x' has the same number of factors as 'z', where 'z' is a positive integer greater than 2

Q56. The greatest common factor of 16 and the positive integer 'n' is 4 and the greatest common factor of 'n' and 45 is 3. Which of the following could be the greatest common factor of 'n' and 210?

A) 3
B) 14
C) 30
D) 42
E) 70

Q57. If integer k is equal to the sum of all even multiples of 15 between 295 and 615, what is the greatest prime factor of k?

A) 5
B) 7
C) 11
D) 13
E) 17

Q58. If 'a' and 'b' are positive integers such that $\left(\frac{a}{b}\right) = 2.86$, which of the following must be a divisor of 'a'?

A) 10
B) 13
C) 18
D) 26
E) 50

Q59. If 'a' and 'b' are positive integers divisible by 6, is 6 the greatest common divisor of 'a' and 'b'?

1) a = 2b + 6
2) a = 3b

Q60. Is x < z?

1) $x = \left(\frac{1}{2}\right)y$
2) y = 0.5 z

Q61. If x and y are integers such that x < y < o, what is the value of x –y?

1) (x + y) (x – y) = 5
2) xy = 6