Number System for SSC Exams

Number System for SSC Tier I Level Exams

1) The sum and product of two numbers are 27 and 180 respectively. What will be the sum of their reciprocals?

a) 20/3

b) 3/20

c) 1/3

d) 1/20

2) Find the sum of all the natural numbers from 25 to 97

a) 4428

b) 4753

c) 4453

d) 4763

3) If a 10-digit number 965458a123 is divisible by 9 then find the value of a?

a) 1

b) 2

c) 3

d) 4

4) What is the value of $1^2 + 2^2 + 3^2 + \ldots\ldots\ldots\ldots + 20^2$

a) 2670

b) 3870

c) 2870

d) 2770

5) What largest number of four digits is exactly divisible by 87?

a) 9912

b) 9918

c) 9928

d) 9916

6) When n is divided by 4, the remainder is 3. The remainder when 2n is divided by 4 is

a) 1

b) 2

c) 3

d) 0

7) $3^{41}+3^{42}+3^{43}+3^{44}+3^{45}$ is divisible by

a) 11

b) 17

c) 19

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d) 21

8) How many times 7 is written in numbers from 1 to 80?

a) 15

b) 16

c) 17

d) 18

9) The least number of the following which on dividing 729000 gives the result of a perfect cube is

a) 6

b) 8

c) 7

d) 12

10) The product of two positive fractions is 14/3 and their quotient is 7/6. The greater fraction is

a) 7/3

b) 3/7

c) 2/1

d) 1/2

11) The unit digit of $(782)^{86}$-$(236)^{25}$ is

a) 2

b) 8

c) 4

d) 6

12) Sum of two numbers is seven times of their difference, their ratio is

a) 4 : 3

b) 3 : 4

c) 2 : 7

d) 7 : 2

13) The number 0.242424……..in the form of p/q is equal to

a) 24/9

b) 8/99

c) 8/33

d) 3/9

14) Out of six consecutive natural numbers, if the sum of first of three is 42, then what is the sum of the other three numbers?

a) 52

b) 51

c) 53

d) 50

15) In a division sum, the divisor is 10 times the quotient and 5 times the remainder. If the remainder is 46, then the dividend is

a) 5336

b) 5346

c) 4946

d) 4336

16) If the operation # is defined by a # b = a + b + ab, then 27# 13 equals to

a) 381

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b) 361

c) 391

d) 371

17) If P = 7/8, Q = 9/10, R = 8/9, then which of the following is correct

a) P>Q>R

b) Q>P>R

c) R>P>Q

d) Q>R>P

18) The number of even factors in 108 is

a) 12

b) 4

c) 8

d) 16

19) The number of prime factors is $4^{10}\times6^{20}\times10^{30}\times8^{40}$

a) 320

b) 240

c) 280

d) 300

20) Which of the following number are divisible 8?

a) 4586196

b) 5689604

c) 7859648

d) 6584442

21) The square root of $19+8\sqrt{3}$ is approximately equal to

a) $2 + \sqrt{3}$

b) $6 + \sqrt{3}$

c) $4 + \sqrt{3}$

d) $5 + \sqrt{3}$

22) $(523 \times 647 \times 701 \times 576 \times 852) \div 25$, find remainder

a) 1

b) 24

c) 15

d) 12

23) $1^3+3^3+5^3+\ldots\ldots\ldots\ldots\ldots\ldots11^3=?$

a) 2626

b) 2446

c) 2556

d) 2546

24) Find the total number of digits in 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, up to 687,688

a) 1756

b) 1695

c) 1956

d) 1946

25) If a person removes every odd placed letter when counting from left in alphabetic series (A, B, C, D, ….., Z) and continues the same process what alphabet would be eliminated at last

a) Q

b) P

c) R

d) S

26) If the 10 digit number 5432y1748x is divisible by 72, then for the minimum value of x the value of x/y is –

a) 8⁄3

b) 3⁄8

c) 0

d) Infinite

27) If 4^{61485} is divided by 6 leaves remainder x and x is a factor of least perfect square number y then the value of $y = y^2/x$ is –

a) 4

b) 16

c) 1/4

d) 2

28) The number of factor of 1200 is –

a) 45

b) 8

c) 30

d) 24

29) The unit digit of the expression 231 × 633 × 729 × 525 × 647 is –

a) 1

b) 0

c) 5

d) 7

30) If 123 × PQQP = 123123 then the value of P + Q is –

a) 1

b) 0

c) 2

d) 6

31) When $8^{96} – 2$ is divided by 9 then the remainder is –

a) 1

b) 8

c) 6

d) 3

32) The unit digit of the expression (1! + 2! + 3! + 4! + …….. +100!) × 3 is –

a) 3

b) 9

c) 6

d) 0

33) The total number of prime factor of 3600 is-

a) 45

b) 6

c) 8

d) 11

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34) If X is the number of zeros of 2 × 4 × 6 × 8 × …….. × 100 and y is the number of zeros of 1 × 2 × 3 × 4 × …….× 100 then x : y is –

a) 1: 2

b) 2 : 1

c) 25 : 6

d) 6 : 25

35) If $2^{51!}$ Is divided by 3 then the remainder is-

a) 1

b) 0

c) 2

d) None of these

36) A number N when divided by 779 leaves remainder 47 when the same number N is divided by 19 leaves remainder P then the square root of P is-

a) 9

b) 6

c) 3

d) 27

37) The difference between the place value and the face value of 8 in 178745 is-

a) 8737

b) 7992

c) 170

d) 100

38) Remainder when $17^{19} + 19^{19}$ is divided by 18 is-

a) 9

b) 0

c) 2

d) None of these

39) If the 7 digit number 5y85527 is completely divisible by 11 then possible value of y is –

a) 2

b) 7

c) 4

d) 5

40) If P = ABABAB is a six digit number then P is always be divisible by-

a) 101010

b) 10101

c) 101

d) 1001

41) If A= √15 - √13 and B = √20 - √18 then which of the following condition is correct?

a) A > B

b) B > A

c) A = B

d) None of these

42) If N is a odd number which is greater than 1 then $N(N^2 – 1)$ is always divisible by-

a) 81

b) 24

c) 12

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d) Both b) and c)

43) If $x = (625)^{123} – (414)^{513} – (616)^{126}$ then the unit digit of x is

a) 5

b) 6

c) 3

d) 4

44) The total number of zeros in 18! +19! is

a) 3

b) 4

c) 5

d) 6

45) The sum of factors of 120 is-

a) 360

b) 240

c) 720

d) 1080

46) The product of factor of 150 is –

a) $(150)^{12}$

b) $(150)^{3}$

c) $(150)^{6}$

d) $(150)^{9}$

47) A number N when successively divided by 3, 4, 7 leaves remainder 2, 1, 4 respectively when the same number is divided by 84 then the remainder is –

a) 80

b) 76

c) 53

d) 41

48) The number of integers between 100 and 200 which are divided by 7-

a) 40

b) 37

c) 14

d) 38

49) A 8 digit number 108x412y which is completely divisible by 88. Find the value of (2y – x)

a) 4

b) 6

c) 8

d) 10

50) What should be added to the expression (10×12×14×16) so that the expression becomes a perfect square -

a) 1

b) 16

c) 4

d) 2

Answers

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1) Answer: B

Let x and y are two numbers

x + y = 27 and xy = 180

1/x +1/y = (x + y)/xy

= 27/180 = 3/20

2) **Answer: C**

Sum of all n natural numbers = n (n+1)/2

⇒ (97×98)/2 – (24×25)/2

⇒ 4753 – 300 = 4453

3) **Answer: B**

Divisibility of 9: A number will be divisible by 9 if the sum of the digits of the number is divisible by 9.

Sum of the given number is = (9 + 6 + 5 + 4 + 5 + 8 + a + 1 + 2 + 3)

= (43+a)

⇒ (43 + a) is to be divisible 9 if a = 2

4) **Answer: C**

Sum of square of all natural numbers = n (n + 1)(2n + 1)/6

Here n = 20

⇒ 20 × 21 × 41/6 = 2870

5) **Answer: B**

We know that four digits largest number is 9999

Hence in order to find the largest four digit number divisible by 87 we will divide 9999 and check if it will completely divide the number or we will get some remainder .

⇒on dividing 9999/87

We get quotient = 114 and remainder = 81

∴The largest four digit number divisible by 87 will be 9999 – 81 = 9918

6) **Answer: B**

Let x be the quotient

We know that

(Dividend) = (divisor × quotient) + remainder

⇒ n = 4x + 3

Now 2n = 8x + 6

When 2n is divide by 4, 8x will be completely divided but when 6 is divided by 4 it gives remainder = 2

Thus the remainder when 2n is divided by 4 is 2.

7) **Answer: A**

$3^{41}+3^{42}+3^{43}+3^{44}+3^{45}= 3^{41}(1+3^1+3^2+3^3+3^4)$

$= 3^{41}(1+3+9+27+81)$

$= 3^{41} \times 121$

121 is a multiple of 11. So the possible answer is 11

8) Answer: D

From the given data

We can write 7 at unit place of 7,17,27,37,47,57,67

Also we can write at ten's place numbers

70,71,72,73,74,75,76,77,78,79

∴ Total =18 times

9) Answer: B

$729000 = 9^3 \times 2^3 \times 5^3$

As we can see, 729000 is already a perfect cube it will only give a perfect cube on dividing by any one of its perfect cube factors.

Since the smallest perfect cube factor apart from 1 is 8, it should be divided by 8 to get a perfect cube.

10) Answer: A

Let's assume that the two fractions are X and Y

∴ Product of two fractions = XY = 14/3 …… (i)

& quotient of two fractions = X/Y= 7/6 ……(ii)

⇒ x = 7Y/6

Putting the value of X in equation (i)

Y×(7Y/6) = 14/3

$\Rightarrow Y^2 = 4$

⇒Y = 2

& X = 7×2/6 = 7/3

The greater fraction is = 7/3

11) Answer: B

The unit digit of $(782)^{86} = (2)^{\text{remainder } (86/4)} = (2)^2 = 4$

The unit digit of $(236)^{25} = (6)^{\text{remainder } (25/4)} = (6)^1 = 6$

The unit digit of $(782)^{86}-(236)^{25}$ is = 4 – 6

= 14(taking 1 carry) – 6 = 8

12) Answer: A

Let's assume two numbers are x and y

x + y =7(x – y)

x + y = 7x – 7y

8y = 6x

x/y = 4/3

13) Answer: C

Let x = 0.242424……

Multiplying both sides by 100 we get,

100x = 24.242424……

100x = 24 + 0.242424…….

100x = 24 + x

100x – x = 24

x = 24/99 = 8/33

So p/q form is = 8/33.

14) Answer: B

Let first three consecutive natural numbers are x, x + 1, x + 2.

So x + x + 1 + x + 2 = 42

3x + 3 = 42

x = 13

The sum of next three numbers are x + 3 + x + 4 + x + 5= 3x + 12

3x + 12 = 3×13 + 12 = 51

15) Answer: A

Given that the remainder is 46

And divisor = 5 × remainder

Divisor = 5 × 46 = 230

Divisor = 10 × quotient

230 = 10 × quotient

So quotient = 23

We know that

(Dividend) = (divisor× quotient) + remainder

= 230× 23 + 46

= 5336

16) Answer: C

Given that a # b = a + b + ab

27#13 = 27+13+27×13

= 391

17) Answer: D

P = 7/8 = 0.875; Q = 9/10 = 0.900; R = 8/9 = 0.888

SO Q>R>P is correct

18) Answer: C

If x is any number such that

$x = P^a \times Q^b \times R^c$

⇒Where PQR are co-prime to each other then

Total number of factors = (a + 1)(b + 1)(c + 1)

$108 = 2^2 \times 3^3$

The total number of factors are = (2 + 1) × (3 + 1) = 3×4 = 12

Total number of odd factors are = (3+1) = 4

Total number of even factors is = (Total number of factors – Odd number of factor)

= 12 – 4 = 8

19) Answer: B

If x is any number such that

$x = P^a \times Q^b \times R^c$

Where PQR are co prime to each other then the number of prime factor of x is given by-

Number of prime factor is (a + b + c)

$4^{10} \times 6^{20} \times 10^{30} \times 8^{40} = 2^{20} \times 2^{20} \times 3^{20} \times 2^{30} \times 5^{30} \times 2^{120}$

$= 2^{190} \times 3^{20} \times 5^{30}$

Number of prime factor = 190 + 20 + 30 = 240

20) Answer: C

Divisibility of 8: A number will be divisible by 8 if the last three digits of the number are divisible by 8.

Only option C follows divisibility rule of 8 as last three digits (648) are completely divisible by 8.

21) Answer: C

Let $x = 19 + 8\sqrt{3}$

$x = 4^2 + (\sqrt{3})^2 + 2*4*\sqrt{3}$

$x = (4+\sqrt{3})^2$

So square root of x is given by -

$\sqrt{x} = (4 + \sqrt{3})$

22) Answer: D

Remainder of (523/25) = -2

Remainder of (647/25) = -3

Remainder of (701/25) = +1

Remainder of (576/25) = +1

Remainder of (852/25) = +2

(-2)× (-3) × (+1) × (+1) × (+2) = +12

So when 12 / 25 the remainder = 12

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23) Answer: C

Formula (only for odd numbers) = $n^2(2n^2 - 1)$

Where n = total of number of term

Here n = 6

= $6^2(2\times 6^2 - 1)$

= 36×71

= 2556

24) Answer: C

Number	Total number of terms	Total number of digit
1 to 9 (all 1 digit numbers)	9	$1 \times 9 = 9$
10 to 99 (all 2 digit numbers)	90	$2 \times 90 = 180$
100 to 688 (all 3 digit)	589	$3 \times 589 = 1767$

So the total numbers of digits are 9 + 180 + 1767 = 1956

25) Answer: B

Actual Method:

If we remove every odd placed letter from the alphabet (A, B, C, D, E, F, ……., Z)

We will get = (BDFHJLNPRTVXZ)

Again removing odd placed letter we will get (DHLPX)

Again removing odd placed letter we will get (HP)

Again removing odd placed H we will get only (P) which is to be eliminated at last

Shortcut method:

Shortcut:

Last eliminated value placed at = 2^{max} position

There are 26 letters is English alphabet so the 2^{max} position is 16 (2^4)

P is situated at the 16^{th} position when counting from left hence P will be eliminated last.

26) Answer: C

10 digit number is divisible by 72 if the number divisible by 8 and 9 both.

Divisibility of 8: A number will be divisible by 8 if the last three digits of the number are divisible by 8.

Divisibility of 9: A number will be divisible by 9 if the sum of its digits is divisible by 9.

48x is divisible by 8 if x = 0 and 8

Hence, The minimum value of x is 0 hence the value of x/y= 0

27) Answer: A

For any power of 4 if it is divisible by 6 then remainder is always 4.

$\Rightarrow 4^{61485} \div 6$

Remainder = 4

Hence the value of x is 4

And 4 itself a least perfect square number having 4 a factor so the value of Y is also 4.

$\Rightarrow y^2/x \Rightarrow 16/4 = 4$

28) Answer: C

If x is any number such that

$x = P^a \times Q^b \times R^c$

⇒Where PQR are co-prime to each other then

Total number of factors = (a + 1)(b + 1)(c + 1)

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$1200 = 2^4 \times 3^1 \times 5^2$

So the number of factor is $5 \times 2 \times 3 = 30$

29) Answer: C

Unit digit of the expression = $1 \times 3 \times 9 \times 5 \times 7 = 5$

30) Answer: A

As we know that any 3- digit number when multiply by 1001 is gives a 6- digit number repeating three digits.

ABC × 1001 = ABCABC

So in the given question the value of PQQP = 1001 hence P = 1 and Q = 0 and the value of P + Q = 1

31) Answer: B

For $(8^{96} - 2)/9 = \{(-1)^2 - 2\}/9$

⇒ Remainder = -1

So, the positive remainder is 9 + (-1) = 8

32) Answer: B

As we know that n! = n (n – 1) (n – 2) ……. (1)

1!=1; 2!=2; 3!=6; 4!=24; 5!=120; 6!=720 and so on…..

⇒ (1+2+6+24+120+720+5040+……)×3

Factorials starting from 5! end with digit 0 because they will have at least one 2 and one 5 in their product…So they don't contribute in the last digit.

So,

Last digit = 1 + 2 + 6 + 4 +0 = 3

⇒ (……3) × 3

= 3 × 3 = 9

33) Answer: C

If x is any number such that

$x = P^a \times Q^b \times R^c$

Where PQR are co-prime to each other then the number of prime factor of x is given by-

Number of prime factor is (a + b + c)

For, $3600 = 2^4 \times 3^2 \times 5^2$

So the number of prime factor is 4 + 2 + 2 = 8

34) Answer: A

No of zeros (x) in $2 \times 4 \times 6 \times 8 \times \ldots\ldots\ldots \times 100 = 2^{50}(1234\ldots\ldots50)$

$= 2^{50} \times 50!$

⇒ No of zeros in 50! = 50/5 + 50/25

x = 10 + 2 =12

⇒ No of zeros (y) in $1 \times 2 \times 3 \times 4 \times \ldots\ldots\ldots \times 100 =$ 100!

No of zeros (y) in 100! = 100/5 + 100/25

y = 20 + 4 = 24

Hence x : y = 12 : 24 = 1 : 2

35) Answer: A

To find the remainder of given expression $2^{51!} \div 3$ can be written as $(-1)^{51!} \div 3$

Here 51! is an even power which will make $(-1)^{51!}$ To a positive number 1

Hence the remainder = 1

36) Answer: C

We can write, N = 779k + 47

⇒ N/19 = (779k + 47)/19 = 41k + 47/19

Remainder = 9

⇒ Square root of P =√9=3

37) Answer: B

In 178745, place value of 8 = 8000

And the face value is 8

⇒So (8000 – 8) = 7992

38) Answer: B

⇒ $(a^n + b^n)$ is always divisible by (a + b), when n is an odd power.

17 + 19 = 36

Factors of 36 = (1, 2, 3, 4, 6, 9, 12, 18, 36)

So, $(17^{19} + 19^{19})$ is completely divided by 18.

Hence, remainder = 0

39) Answer: B

Divisibility of 11: If the difference between the sum of the odd numbered digits and the sum of the even numbered digits is either 0 or the multiple of 11 so the Number will be divisible by 11.

⇒ (Sum of odd numbered digits – Sum of even numbered digits)

⇒ (5+8+5+7) - (y+5+2) = 11

Hence y = 7

40) Answer: B

ABABAB =100000A + 10000B + 1000A + 100B + 10A + 1B

= 10 A (10000 + 100 + 1) + B (10000 + 100 + 1)

= 10101(10A + B)

So P is always divisible by 10101.

41) Answer: A

1/A= (√15+√13)/2 and 1/B = (√20+√18)/2

1/A= 3.7385 and 1/B = 4.357

It is clear that 1/A <1/B

Hence the answer is A > B

42) Answer: D

Let's take different value of N

For N = 3 the value of $N(N^2-1)$ = 24

For N = 5 the value of $N(N^2-1)$ = 120

For N= 7 the value becomes = 7×48

So, for all the different value of N the given function is always divisible by 12 and 24.

43) Answer: A

The Unit digit of $(625)^{123}$= 5,

$(414)^{513}$= 4 and $(616)^{126}$=6

So the unit digit of X will be ⇒ (5-4-6) = 5

44) Answer: B

= (18! +19!)

= (18! + 19×18!)

= 18!(1 + 19) ⇒ 18! (3 zeros) × 20 (1 zeros)

Hence the total number of zeros is 4

45) Answer: A

$120= 2^3 \times 3^1 \times 5^1$

Sum of factors = $(2^0+2^1+2^2+2^3)$ (3^0+3^1) (5^0+5^1)

= 15 × 4 × 6 = 360

46) Answer: C

Product of factor is given by (Number) $^{(\text{Total number of factor}/2)}$

Total number of factor of 150= $2^1 \times 3^1 \times 5^2$

= 2 × 2 × 3 = 12

So, the product of factor = $(150)^6$

47) Answer: C

For successive remainder the required number N -

7 x 1+ 4 =11

4 x 11+ 1 =45

3 x 45 + 2 =137

N = 137

So if N / 84 =137/84

⇒ Remainder = 53

48) Answer: C

The first and last number between 100 and 200 which is divisible by 7 is 105 and 196 respectively.

The total number of integers = (First term - Last term)/difference + 1

⇒ [(196 – 105)/7] +1

⇒ 91/7 + 1 = 14

Alternative method

a=105

d=7

a_n=196

a_n=a+ (n-1) d

196=105+ (n-1)7

n=14

49) Answer: D

The 8 digit number 108x412y is divisible by 88 if it is divisible by 8 and 11 both.

Divisibility of 8: A number will be divisible by 8 if the last three digits of the number are divisible by 8.

Divisibility of 11: If the difference between the sum of the odd numbered digits and the sum of the even numbered digits is either 0 or the multiple of 11 so the Number will be divisible by 11.

⇒ 12y is divisible by 8 if y = 0 and 8

If y = 8, 108x4128 is divisible by 11 if and only if -

⇒ (Sum of odd numbered digits – Sum of even numbered digits) =0

⇒ (1+8+4+2) – (0+x+1+8) = 0

⇒ x= 6

Hence x = 6 y = 8

⇒ (2y – x) = (2×8 – 6) = 10

50) Answer: B

We know that,

⇒ [x (x + 1) (x + 2) (x + 3) + (Difference) $^{\text{number of terms}}$] is a perfect square number.

For, 10 x 12 x 14 x 16 + $(2)^4$ = 26896 which equal to $(164)^2$

Hence 16 is added to the given expression to make it perfect square.

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