SSC CHSL Number System Questions

Instructions
For the following questions answer them individually

Question 1

A 4-digit number is formed by repeating a 2-digit number such as 1515, 3737, etc. Any number of this form is exactly divisible by

A 7

B 11

C 13

D 101

Answer: D

Explanation:
let's say digit is pqpq
or pq00 + pq
or pq*100 + pq
or pq (100 + 1)
or pq (101)
hence digit will always be divisible by 101

Question 2

If p and q represent digits, what is the possible maximum value of q in the statement 5p9 + 327 + 2q8= 1114?

A 9

B 8

C 7

D 6

Answer: C

Explanation:
We can break the sum according to 500 + 10p +9 + 327 + 200 + 10q + 8 = 1114
or 1027 + 17 + 10(p+q) = 1114
or (p+q) = 7
so for q to be maximum p will be zero then q = 7

Question 3

Out of six consecutive natural numbers, if the sum of first three is 27, what is the sum of the other three ?

A 36

B 35

C 25

D 24

Answer: A

Explanation:
let's say 6 consecutive numbers are (a-d), a, (a+d), (a+2d), (a+3d), (a+4d)
where d is the common difference i.e. 1 (given) and a is second term
summation of first three terms will be 3a = 27
hence second term a = 9

now sequence is 8,9,10,11,12,13,
so sum of last three terms 36

Question 4

If'n' be any natural number. then by which largest number $(n^3 - n)$ is always divisible ?

A 3

B 6

C 12

D 18

Answer: B

Explanation:
$(n^3 - n)$ can be written as n(n-1)(n+1)
for n to be any natural number, $n^3 - n$ is a product 3 consecutive numbers starting from 1.
hence for any value of a min. product of 6 will be there hence it is always be divisible by 6.

Question 5

I multiplied a natural number by 18 and another by 21 and added the products. Which one of the following could be the sum?

A 2007

B 2008

C 2006

D 2002

Answer: A

Explanation:
let's say one number is n and another number is p
so acc. to question sum will be 18n+21p
and this number will be divisible by 3 so answer will be (A)

Question 6

The unit digit in the product 122^{173} is

A 2

B 4

C 6

D 8

Answer: A

Explanation:
As we know a number with unit digit 2 have repeating cycle of 2,4,8,6 after every fourth power
as power is 173 or (172+1) where till 172 , 43rd cycle will get complete and next unit digit will be 2.

Question 7

Which one of the following will completely divide $5^{71} + 5^{72} + 5^{73}$?

A 150

B 160

C 155

D 30

Answer: C

Explanation:
Among all options only option C has unit digit 5, and in given equation unit digit will also be 5.
So only 155 can divide the given equation completely.

Question 8

When 'n' is divided by 5 the remainder is 2. What is the remainder when n^2 is divided by 5?

A 2

B 3

C 1

D 4

Answer: D

Explanation:
n = 5k+2 (where k is quotient)
so $n^2 = 25k^2 + 4 + 20k$
Now when n^2 will divided by 5 , remainder will be 4.

Question 9

A student was asked to divide a number by 6 and add 12 to the quotient. He, however, first added 12 to the number and then divided it by 6, getting 112 as the answer. The correct answer should have been

A 124

B 122

C 118

D 114

Answer: B

Explanation:
Let's say number is N
So according to student result is $112 = \frac{N+12}{6}$
or N = 660
Correct answer will be = $\frac{660}{6} + 12 = 110 + 12 = 122$

Question 10

If 17^{200} is divided by 18, the remainder is

A 1

B 2

C 16

D 17

Answer: A

Explanation:
$17^{200} = (18-1)^{200}$
Hence, when it is divided by 18, the reminder equals $(-1)^{200} = 1$

Question 11

The unit digit in the sum of $(124)^{372} + (124)^{373}$ is

A 5

B 4

C 20

D 0

Answer: D

Explanation:
Both of numbers have unit digit as 4 and it has a repeating cycle of 2 with unit digits as 4 and 6
so in first number power is 372 which is exactly divisible by 2 hence unit digit of first number will be 6.
and in second number power is 373 which exceeds one with the reapeating cycle of 2 hence its unit digit will be 4.

now unit digit of the sum will be 6+4 = 10

Question 12

The next term of the series 1, 5, 12, 24, 43 is

A 51

B 62

C 71

D 78

Answer: C

Explanation:
1+4=5
5+(4+3)=12
12+(4+3+5)=24
24+(4+3+5+7)=43
43+(4+3+5+7+9)=71

Question 13

The least multiple of 13 which when divided by 4, 5, 6, 7 leaves remainder 3 in each case is

A 3780

B 3783

C 2520

D 2522

Answer: B

Explanation:
Number will be equal to 420t +3 = 13M
put values of M and t accordingly and find least value of it.

Question 14

If 21 is added to a number, it becomes 7 less than thrice of the number. Then the number is

A 14

B 16

C 18

D 19

Answer: A

Explanation:
21+x=3x-7
or 2x=28
x = 14

Question 15

A number x when divided by 289 leaves 18 as the remainder. The same number when divided by 17 leaves y as a remainder. The value of y is

A 2

B 3

C 1

D 5

Answer: C

Explanation:
The number is of the form 289n+18.
Which is equal to 17*(17n+1) +1
So, when the number is divided by 17, the reminder is 1

Question 16

The value of $\frac{1}{1+\sqrt{2}} + \frac{1}{\sqrt{2}+\sqrt{3}} + \frac{1}{\sqrt{3}+\sqrt{4}} + \ldots\ldots + \frac{1}{\sqrt{8}+\sqrt{9}}$ **is**

A 1

B 0

C 2

D √2

Answer: C

Explanation:

Expression : $\frac{1}{1+\sqrt{2}} + \frac{1}{\sqrt{2}+\sqrt{3}} + \frac{1}{\sqrt{3}+\sqrt{4}} + ... + \frac{1}{\sqrt{8}+\sqrt{9}}$

After rationalizing, the denominator of each term will be 1, the numerator will be

= $\sqrt{2}$ - 1 + $\sqrt{3}$ - $\sqrt{2}$ + $\sqrt{4}$ - $\sqrt{3}$ +.....+ $\sqrt{8}$ - $\sqrt{7}$ + $\sqrt{9}$ - $\sqrt{8}$

Now, all the terms will cancel out except

= $\sqrt{9}$ - 1 = 3-1

= 2

Question 17

The digit in the unit place in the square root of 66049 is

A 3

B 7

C 8

D 2

Answer: B

Explanation:

Square root of 66049 = 257

Thus, unit's digit = 7

Question 18

The least number that should be added to 2055, so that the sum is exactly divisible by 27 is

A 28

B 24

C 27

D 31

Answer: B

Explanation:

The remainder obtained by dividing 2055 by 27 = 3

So, the least number that should be 'subtracted' from 2055 to make it perfectly divisible by 27 = 3

and the least number that should be added = 27-3 = 24

Question 19

$\frac{1}{\sqrt{7}-\sqrt{6}} - \frac{1}{\sqrt{6}-\sqrt{5}} + \frac{1}{\sqrt{5}-2} - \frac{1}{\sqrt{8}-\sqrt{7}} + \frac{1}{3-\sqrt{8}}$ **is**

A 7

B 0

C 1

D 5

Answer: D

Explanation:

$\frac{1}{\sqrt{7}-\sqrt{6}} - \frac{1}{\sqrt{6}-\sqrt{5}} + \frac{1}{\sqrt{5}-2} - \frac{1}{\sqrt{8}-\sqrt{7}} + \frac{1}{3-\sqrt{8}}$

Rationalizing each term, we get, the denominator of each term will be 1, we get :

$= \sqrt{7} + \sqrt{6} - (\sqrt{6} + \sqrt{5}) + \sqrt{5} + 2 - (\sqrt{8} + \sqrt{7}) + 3 + \sqrt{8}$

= 2+3 = 5

Question 20

If $2 + x\sqrt{3} = \frac{1}{2+\sqrt{3}}$ then the simplest value of x is

A - 1

B 1

C - 2

D 2

Answer: A

Explanation:

$2 + x\sqrt{3} = \frac{1}{2+\sqrt{3}}$

Rationalizing the R.H.S.

$\Rightarrow 2 + x\sqrt{3} = \frac{1}{2+\sqrt{3}} * \frac{2-\sqrt{3}}{2-\sqrt{3}}$

$\Rightarrow 2 + x\sqrt{3} = \frac{2-\sqrt{3}}{4-3}$

$\Rightarrow 2 + x\sqrt{3} = 2 - \sqrt{3}$

Comparing both sides, we get x = -1