NUMBER SYSTEM PYQ _CSAT_ANSWER EXPLANTIONS

Answer 1: (C)

We know that, when we write any number in the form of ABCABC, then that number must be divisible by 13, 11 and 7 or ABCABC is the multiple of 1001

So, 1001 = DEED

1001 = 13 × 11 × 7

ABC × DEED = ABC ABC

⇒ ABC × 1001 = ABC ABC

On comparing D = 1, E = 0

Answer 2: (D)

Take the LCM of 2, 3, 4, 5, 6 = 60

So, every 60^{th} day all five hobby clubs meet.

Hence, within 180 days all the five groups will meet on the same day = 180/60 = 3 times.

i.e. on 60^{th}, 120^{th} and 180^{th} day.

Answer 3: (B)

Let the numbers be R = 5x and S = 5y, where x, y being integers.

Case A: R - S = 5x - 5y = 5(x - y), which is divisible by 5

Case B: R + S = 5x + 5y = 5(x + y), which is divisible by 5 but not by 10.

Hence, option B is wrong

Case C: R × S = 5x × 5y = 25(xy), which is divisible by 25.

Case D: $R^2 + S^2 = =25x^2 + 25y^2 = 25(x^2 + y^2)$, which is divisible by 5.

Answer 4: (C)

Let the number of bees be x, then the number of flowers = (x - 1)

If the number of bees sitting on each flower is 2, then number of flowers = (x/2 + 1)

According to question,

⇒ (x/2 + 1) = (x - 1)

⇒ x - x/2 = 2

⇒ x/2 = 2

⇒ x = 4

Therefore, number of bees is 4 and the number of flowers is (4 - 1) = 3

Answer 5: (A)

From 100 to 199, there are 10 numbers ending with 2. i.e. 102, 112, 122, 132, 142, 152, 162, 172, 182, 192.

And from 200 to 300, there are 100 numbers beginning with 2. They are 200, 201, 202...,299.

So, there are 110 numbers between 100 and 300 which either begin with or end with 2

Answer 6: (B)

Pillar X: In one chance, A climbs on X by 6 cm but slips down 1 cm.

Hence, in one chance A climbs 6 – 1 = 5 cm.

Height attained after 39 chances = 39 × 5 = 195 cm

Thereafter in the 40^{th} and last chance it will climb 6 cm to reach the top.

So, height of pillar X = 195 + 6 = 201 cm

Pillar Y: In one chance, B climbs on Y by 7cm but slips down 3cm.

Hence, in one chance B climbs 7 – 3 = 4 cm.

Height attained after 39 chances = 39 × 4 = 156 cm

Thereafter in the 40^{th} and last chance it will climb 7 cm to reach the top.

So, height of pillar Y = 156 + 7 = 163 cm

Pillar Z: In one chance, C climbs on Z by 6.5 cm but slips down 2 cm.

Hence, in one chance C climbs 6.5 – 2 = 4.5 cm Height attained after 39 chances = 39 × 4.5 = 175.5 cm

Thereafter in the 40^{th} and last chance it will climb 6.5 cm to reach the top.

So, height of pillar Z = 175.5 + 6.5 = 182 cm

So, height of the shortest pillar (i.e. pillar Y) = 163 cm

Answer 7: (A)

These are consecutive odd numbers.

The mean of the first 5 such numbers will be third such number, which is given to be as 39.

Hence, the series is: 35, 37, 39, 41, 43, 45, 47, 49, 51 and so on.

Now, mean of all the thirteen numbers

$= \frac{13-1}{2} + 1 = 7^{th}$ term from the start, i.e. 47

Answer 8: (B)

Let the number be "100x + 10y + z", where x, y, and z is the single digit number.

Now, the reverse number will be "100z + 10y + x"

Both numbers are divisible by 7. Hence, their difference also divisible by 7

⇒ (100x + 10y + z) - (100z + 10y + x) = 7p, where p is an integer

⇒ 99 × (x - z) = 7p

Now 99 is not divisible by 7, therefore (x - z) should be divisible by 7.

Thus, we have (x - z) = 7 and possible numbers for (x, z) is (9, 2) and (8, 1) respectively.

x	y	z	
↓		↓	
1		8	4
8		1	
9		2	
2		9	

In 1_8: The ten's digit should be 6 and the number shall be 168 and the reverse number 861 also divisible by 7.

So, two of our required number are 168 and 861

Now in 2_9: Ten's digit should be 5 and number shall be 259 and the reverse number is 952 is also divisible by 7.

Thus, the other two number are 259 and 952.

∴ The required result will be 4.

Answer 9: (C)

Now, for 99 to 200: 8 will come at the unit's place 10 times, i.e. 108, 118, 128…. 198.

For 201 -300: 8 will come at the unit's place 10 times, i.e. 208, 218, 228…. 298.

Similarly, will be the case with number sets of 301 - 400, 401 - 500 etc.

Hence, the number of times that 8 will come at unit's place between 99 and 1000 = 10 × 9 = 90

$$\left.\begin{array}{l} 99-200 \rightarrow 10 \\ 201-300 \rightarrow 10 \\ : \\ : \\ : \\ 901-1000 \rightarrow 10 \end{array}\right\} 10\times 9 = 90$$

Answer 10: (D)

let the two-digit number be (10x + y) and if the number is Reverse, then we get (10y + x).

And assume (10x + y) > (10y + x).

For the number to be the highest number, then one of the digits must be 9.

So, the ten's place digit will be 9.

Therefore, if x = 1, the numbers will be 91 and 19.

The remainder got when we divide 91 by 19 is 15.

Also, if x = 8, the numbers will be 98 and 89.

The remainder got when we divide 98 by 89 is 9.

Hence, the value of x must not be very small or very large.

So, we may try the values 4 and 5.

If x = 5: Numbers are 95 and 59.

Remainder got on dividing 95 by 59 = 36

If x = 4: Numbers are 94 and 49.

∴ Remainder got on dividing 94 by 49 = 45.

Hence, the highest possible remainder is 45.

Answer 11: (D)

Let the numbers be of the form 10x + y and 10y + x (where y > x)

According to the question,

(10y + x) – (10x + y) = 27

Or, 9y – 9x = 27

Or, y – x = 3

So, possible sets of the value of x and y are: 14, 41, 25, 52, 36, 63, 47, 74, 58, 85, 69, 96 i.e. 12 such numbers are there and the no. of pairs of such numbers is 6.

Answer 12: (B)

Number of digits from 1 to 150

= Number of units digit's + Number of tens digit's + Number of hundred's digits

= 150 + (150 - 9) + (150 - 99) = 150 + 141 + 51 = 342

Alternate method:

1-9 = 9 digits

10-99 = 90 × 2 = 180 digits

100-150 = 57 × 3 = 153 digits

Number of digits from 1 to 150

= 9 + 180 + 153 = 342

Answer 13: (D)

Let the required digit be x

Then,

x + 1x + 2x + x3 + x1 = 21x

⇒ x + 10 + x + 20 + x + 10x + 3 + 10x + 1 = 200 + 10 + x
⇒ 22x = 210 - 34 = 176
⇒ x = 8
Hence, the required digit is 8

Answer 14: (D)
X lies between -3 to -1
So, $0 < x^2 < 9$
Y lies between -1 to 1
So, $0 < y^2 < 1$
Least value of $x^2 - y^2 = 0 - 0 = 0$
Maximum value of $x^2 - y^2 = 9 - 0 = 9$
So, $0 < x^2 - y^2 < 9$
∴ Option 4 will be the correct choice.

Answer 15: (A)
Let x = 2 and y = 3
(A) xy = 2×3 = 6
(B) x/y = 2/3
(C) y/x = 3/2
(D) (x+y)/xy = 5/6
Hence, option A represents the largest number.

Answer 16: (B)
xyz–zyx = 99|x–z| = 198

$x–z = \frac{198}{99} = 2$

Let the number be 100x + 10y + z, then after interchanging the number will be 100z + 10y + x.
According to Question,
100z + x - (100x + z) = 198
⇒ 99z – 99x = 198
⇒ z – x = 2
Hence, the difference between the first and last digits = 2

Answer 17: (C)
When the second digit is 1, third digit can be 0, i.e., there is one such number.
When the second digit is 2, third digit can be 0 or 1, i.e., there are 2 such numbers.
When the second digit is 3, third digit can be 0, 1 or 2, i.e., there are 3 such numbers, and so on.
When the first digit is 7, second digit can be 1, 2, 3, 4, 5 or 6
710
720 721
730 731 732
740 741 742 743
750 751 752 753 754
760 761 762 763 764 765
So, there are (1 + 2 + 3 + 4 + 5 + 6) = 21 such numbers between 700 and 799
When the first digit is 8, second digit can be 1, 2, 3, 4, 5, 6 or 7
So, there are (1 + 2 + 3 + 4 + 5 + 6 + 7) = 28 such numbers between 800 and 899
When the digit is 9, second digit can be 1, 2, 3, 4, 5, 6, 7 or 8
So, there are (1 + 2 + 3 + 4 + 5 + 6 + 7 + 8) = 36 such numbers between 900 and 999
Hence, the required number
= (21 + 28 + 36)
= 85

Answer 18: (D)
It is given that x - y = 8
I. We may have x = 6 and y = - 2
So, it is not necessary that both x and y are positive.
II. If x is positive, then it is not necessary that y is negative, as x = 15 and y = 7
III. If x < 0, then y = x - 8 which is clearly less than 0
So, if x is negative, then y must be negative.
Hence, none of the options is true.

Answer 19: (C)
Total number of times digit 5 appears between 1 to 100 = 20 times.
Therefore, total number of times digit-5 appearing between 1 to 1000, is 20 x 10 = 200 times

$$\left.\begin{matrix} 1-100= \\ 101-200= \\ . \\ . \\ . \\ 901-1000= \end{matrix}\right\} 10\ slots \times 20 = 200\ times$$

Occurrence of 5 at hundredth place from 500 to 599 = 100 times
Therefore, the total number of times 5 digits would appear = 200 + 100 = 300

Answer 20: (B)
Players who play both Cricket and Football = Number must be divisible by both 4 and 6
= LCM (4, 6) = 12
There will be 8 multiples of 12 between 1 and 100 i.e. 12, 24, 36, 48, 60, 72, 84, 96

Answer 21: (B)

Let the two-digits number be 10x + y.

And the two-digits number after reversing the digit be 10y + x.

According to the question,

$$\frac{10x + y}{10y + x} = \frac{4}{7}$$

⇒ 70x + 7y = 40y + 4x

⇒ 66x = 33y

⇒ x/y = 1/2 = 1 : 2

Numbers of this form are 12, 24, 36, 48

∴ Hence, option 2 will be the correct choice.

Answer 22: (C)

Given: x ≥ 25, y ≤ 40

Option (A):

x cannot always be greater than y.

For example: x = 35 and y = 30

Option (B):

x ≥ 25 and y ≤ 40 or, -y ≥ -40

Adding both inequalities,

(x - y) ≥ 25 - 40

(x - y) ≥ -15

(y - x) ≤ 15

Hence, option B is not correct.

Option (C):

x ≥ 25 and y ≤ 40 or, -y ≥ -40

Adding both inequalities,

(x - y) ≥ 25 - 40

(x - y) ≥ -15

(y - x) ≤ 15

Hence, option C is correct.

Option (D):

(x+y) may be more than 65 is correct but not always.

For example: x = 26 and y = 30

So, x + y = 26 + 30 = 56, which is less than 65.

Answer 23: (C)

The single-digit page (From 1 to 9) = 9 digit

Double digit page (From 10 to 99) = 2 × 90 = 180 digits

Three digits page (From 100 to 999) = 3 × 900 = 2700 digit

Total digit used = 9 + 180 + 2700 = 2889

The remaining digits = 3089 - 2889 = 200

The number of pages with four digits = 200/4 = 50

∴ Required number of total pages = 999 + 50 = 1049

Answer 24: (D)

The divisibility rule of 3 states that a number is completely divisible by 3, if the sum of its digit is divisible by 3 or multiple of 3.

7 + A + 3 = 10 + A (Possible value of A is 2, 5, 8)

136 + 5B7 = 7A3 (Possible value of B is 6, 7, 8, 9)

For A = 2, B = 8;

⇒ 7 + 2 + 3 = 12, (Which is divisible by 3 or multiple of 3)

∴ The value of B = 8

∴ The required result will be 8.

Answer 25: (C)

As per the divisibility tests, the sum of all the digits of the number should be divisible by 3

So, 4 + 2 + 5 + 2 + 7 + 4 + 6 + B = 30 + B

30 is completely divisible by 3.

So, for remainder 0, the possible values are 0, 3, 6, 9.

∴Hence, the number of possible values of B is 4.

Answer 26: (B)

Statement 1: p and q both are prime numbers.

Let p = 2 and q = 3, then pq = 6

So, pq is an even integer.

Also, let p = 3 and q = 5, then pq = 15

So, pq is an odd integer.

In some cases, our answer is even and in some cases it is odd.

In this case, our answer is not certain.

∴ S1 alone is not sufficient to answer the Question.

Statement 2:

p + q is an odd integer.

Even + Even = Even

Odd + Odd = Odd

Even + Odd = Odd

So, p and q both can't be even numbers and both can't be odd numbers.

Therefore, among p and q, one of them should be even and other should be odd.

Let p = 2 and q = 5, then pq = 10

So, pq is an even integer.

Also, let p = 8 and q = 9, then pq = 72

So, pq is an even integer.

(∵ p × q = Even, if both p and q are even or they form a pair of odd and even numbers.

Also, p × q = Odd, if p and q both are odd)

Therefore, from statement 2, pq is an even integer.

Hence, from statement 2, our answer is certain.
∴ S2 alone is sufficient to answer the Question.
From Statement 1 & 2:
There is no relationship between both the statements, because both are independent statements.
∴ Both S1 and S2 taken together are not sufficient to answer the question.
Hence, option B is our correct choice.

Answer 27: (C)
Whole numbers from 1 to 100 in which one digit is 4 = 4, 14, 24, 34, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 54, 64, 74, 84, 94
Numbers divisible by 4 of these = 4, 24, 40, 44, 48, 64, 84
Numbers not divisible by 4 = 19 - 7 = 12

Answer 28: (B)
Let Ä = x
x + 1x + 5x + xx + x1 = 1xx
⇒ x + (10 + x) + (50 + x) + (10x + x) + (10x + 1) = 100 + 10x + x
⇒ 24x + 61 = 100 + 11x
⇒ 13x = 39
⇒ x = 3

Answer 29: (B)
Minimum length = HCF of 7.5 feet and 3.25 feet = 0.25 foot .

Answer 30: (C)
When we look at the series, we can see all numbers come after a prime number.
14 = 13+1, 18 = 17+1, 20 = 19+1
24 = 23+1, 30 = 29+1, 32 = 31+1
Here, we can see these numbers are coming after a prime number which is in order.
So, the next number will be the number after the next prime number.
The next prime number after 31 will be 37.
So, the next number for the given series will be 37 + 1 = 38

Answer 31: (C)
A3BC + DE2F = 15902
According to question,
C + F = 2, so C + F must be 12
∴ C and F can be either (5, 7) or (4, 8) as numbers are different and more than 3.
Now, B + 2 + 1 = 10
So, B must be 7 as the sum of C and F will give a carry of 1 for this step.
Now, 3 + E + 1 = 9
So, E must be 5 as it will get 1 as carry from the sum of B + 2
Now, in last step, A + D = 15 = 9 + 6 = 8 + 7
So, A and D can be (7, 8) or (9, 6)
But, it is given that all digits are different, therefore A and D must be (9 or 6) as B already has the value 7.
Now, the difference between A and D = |9 - 6|= 3
∴ The difference between A and D will be 3.

Answer 32: (A)
1 × 5 × 10 × 15 × 20 × 25 × 30 × 35 × 40 × 45 × 50 × 55 × 60
= 1 × 5 × (5 × 2) × (5 × 3) × (5 × 4) × (5 × 5) × (5 × 6) × (5 × 7) × (5 × 8) × (5 × 9) × (5 × 10) × (5 × 11) × (5 × 12)
Here, 2 occurs 10 times and 5 occurs 14 times.
Therefore, the given expression will have 10 zeros at the end.

Answer 33: (B)
XYZ is a three-digit number, where (X + Y + Z) is not a multiple of 3.
General form of a number XYZ = X × 100 + Y × 10 + Z
The general form of YZX = 100Y + 10Z + X
The general form of ZXY = 100Z + 10X + Y.
Using above, add the three numbers, we get:
XYZ + YZX + ZXY = (100X + 10Y + Z) + (100Y + 10Z + X) + (100Z + 10X + Y)
= 111X + 111Y + 111Z
= 111(X + Y + Z)
Now, it is clear that 111 is the common factor. So, XYZ + YZX + ZXY is divisible by 111 and it's factors. Factors of 111 are 3 and 37.
But it is given that (X + Y+ Z) is not multiple of 3
Hence, (XYZ + YZX + ZXY) is not divisible by 9.

Answer 34: (C)
Given: p - 2016 = q + 2017 = r - 2018 = s + 2019
Let s = 1
Then, r - 2018 = s + 2019
⇒ r = 2020 + 2018 = 4038
Now, q + 2017 = r - 2018
⇒ q + 2017 = 4038 - 2018
⇒ q = 3

Also, p - 2016 = q + 2017
⇒ p - 2016 = 3 + 2017
⇒ p = 4036
Now,
p - 2016 = q + 2017 = r - 2018 = s + 2019
⇒ 4036 - 2016 = 3 + 2017 = 4038 - 2018 = 1 + 2019
⇒ 2020 = 2020 = 2020 = 2020
Condition satisfied
∴ p = 4036, q = 3, r = 4038, s = 1
∴ r = 4038 is the largest number.

Answer 35: (A)
Let x and y be the required pair of natural numbers.
$x^2 - y^2 = 63$
(x+y) (x–y) = 63
I: x+y = 9, x–y = 7
⇒ x = 8, y = 1
II: x+y = 21, x–y = 3
⇒ x = 12, y = 9
III: x+y = 63, x–y = 1
x = 32, y = 31
Hence, three pairs of natural numbers are there whose difference of squares is 63.

Answer 36: (D)
(i) $\frac{2}{3} = 0.667$
$\frac{2+5}{3+5} = 0.875$
Change = 0.208
(ii) $\frac{3}{4} = 0.75$
$\frac{3+5}{4+5} = 0.89$
Change = 0.14
(iii) $\frac{4}{5} = 0.8$
$\frac{4+5}{5+5} = 0.9$
Change = 0.1
(iv) $\frac{5}{6} = 0.84$
$\frac{5+5}{6+5} = 0.909$
Change = 0.069
∴ 5/6 will show minimum change when 5 is added to both numerator and the denominator

Answer 37: (D)
Given: n is a number, where n > 3 and divisible by 3 but not divisible by 6.
Let the number be number 9.
Now, go through options.
Option A: 2 × 9 = 18; Not divisible by 4.
Option B: 3 × 9 = 27; Not divisible by 4.
Option C: 2 × 9 + 4 = 22; Not divisible by 4.
Option D: 3 × 9 + 1 = 28; Divisible by 4.
∴ Hence, Option D, 3n + 1 is divisible by 4 and is the correct choice.

Answer 38: (D)
$x = \text{HCF}\left(\frac{7}{2}, \frac{35}{4}\right) = \frac{7}{4}$
$= 1\frac{3}{4}$m

Answer 39: (B)
Let x = 1.272727...
100x = 127.2727...
100x–x = 127.2727... – 1.272727...
99x = 126
$x = \frac{126}{99}$
$x = \frac{14}{11}$

Answer 40: (B)
The lowest 4-digit number is 1000.
LCM of 3, 4, and 5 is 60.
Dividing 1000 by 60, we get the remainder 40.
Thus, the lowest 4-digit number that exactly divisible by 3, 4, and 5 = 1000 + (60 - 40) = 1020
Now, required number = 1020 + 2 = 1022

Answer 41: (A)
Divide 51×27×35×62×75 by 100, we get:
$\frac{51 \times 27 \times 35 \times 62 \times 75}{100} = \frac{51 \times 27 \times 35 \times 62 \times 3}{4}$
$= \frac{51 \times 27 \times 35 \times 31 \times 3}{2}$
Here, the remainder will be 1
[∵ 51 × 27 × 35 × 31 × 3 is an odd number]
But we canceled 50 earlier, so the remainder will be 1 × 50 = 50

Answer 42: (B)
According to question,
For n = 0;
$(10^n + 1) = (10^0 + 1) = 1 + 1 = 2$
Sum of digits (In this case, only 2) = 2

For n = 1;
$(10^n + 1) = (10^1 + 1) = 10 + 1 = 11$
Sum of digits = (1 + 1) = 2
For n = 2;
$(10^n + 1) = (10^2 + 1) = 100 + 1 = 101$
Sum of digits = (1 + 0 +1) = 2
For n = 5;
$(10^n + 1) = (10^5 + 1) = 100000 + 1 = 100001$
Sum of digits = (1 + 0 + 0 + 0 + 0 + 1) = 2
This means that for any whole number n, the sum of digits is 2.
Therefore, option B is the correct choice.

$\left(\frac{1}{2}\right)^{-6} = 2^6 = 64$

$\left(\frac{1}{4}\right)^{-3} = 4^3 = 64$

$\left(\frac{1}{3}\right)^{-4} = 3^4 = 81$

$\left(\frac{1}{6}\right)^{-2} = 6^2 = 36$

Therefore, $\left(\frac{1}{3}\right)^{-4}$ is the largest number.

Answer 44: (A)
Conclusion I: True
(LCM) of 2 and 3 is 6.
Therefore, if the numbers are divisible by 2 and 3 Both, then the numbers are definitely divisible by 6.

Conclusion II: False
All numbers that are divisible by 2 and 3 may not be divisible by 4.
For example, 6 is divisible by 2 and 3 but not divisible by 4.
Hence, Only Conclusion I follows.

Answer 45: (D)
From statement 1, Prime numbers between 10 and 20 = 11, 13, 17, 19
From statement 2, there are only two prime numbers 13 and 17 are possible.
Even after combining both the statements you will get set of two numbers i.e., 13 and 17
So, S1 and S2 together are not sufficient to answer the Question.

Answer 46: (C)
Let the two numbers be x and y.
According to S1;
x × y = 21 ----(1)
So, numbers are: (3,7), (1, 21)
According to S2;
x + y = 10 ----(2)
So, numbers are: (1,9), (2, 8), (3, 7), (4, 6), (5, 5)
Hence, required number = (3,7)
∴ S1 and S2 together are sufficient to answer the question, but neither S1 alone nor S2 alone is sufficient to answer the Question.

Answer 47: (C)
$\frac{3^{2019}}{10} = \frac{(3^2)^{1009}.3}{10} = \frac{(9)^{1009}.3}{10}$
Remainder = $\frac{(-1)^{1009}.3}{10} = \frac{-3}{10} = 7$
Hence, option (C) is the correct Answer.

Answer 48: (B)
3798125P369 ÷ 7
Rather than solving this question by divisibility, its better to solve this question with the help of option.
37981256369, Remainder = 0
Hence correct option is (B).

Answer 49: (B)
According to the Question, after 100 days price of petrol becomes constant.
So, price of petrol at 100th day i.e., maximum price = 80 + 0.1 × 100
= 80 + 10
= 90
Now, let on 'n' the day the price of both the fuels becomes equal.
90 = 69 + 0.15n
$n = \frac{90-69}{0.15} = \frac{21}{0.15}$ =140th day

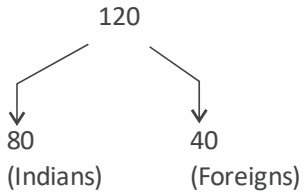
January	*February*	*March*	*April*	*May*
31 *days*	28 *days*	31 *days*	30 *day*	↓
		120 *day*		+20 *days*

So, on 20th may 2021, prices of both the fuels will be equal.
=So, option (b) is the correct Answer.

Answer 50: (D)

The population is doubling every 12 years the equation will be exponential such that $P = 50 \times (2)^x$
Now when n = 0, P = 50
We get $50 = 50 \times 2^x$
$\Rightarrow 2^0 = 2^x$
$\Rightarrow x = 0$
When n = 12, P = 100 (as it doubles in 12 years)
So we get $100 = 50 \times 2^x$
$\Rightarrow 2^1 = 2^x$
$\Rightarrow x = 1$
Similarly, n = 24, P = 200 and we get x = 2
So, the relation between x and n is x = n/12 and the equation for the model becomes **$P = 50 \times 2^{n/12}$.**
Clearly, we can say that option (D) is the correct Answer.

Answer 51: (D)



& 70 persons can speak English.
Condition I:- When all (40) the foreigners speak English.
then 30 Indian will speak English.
Condition II :- When all the foreigners are not speaking English (less than 40) then more than 30 Indians will speak English.
Considering both the conditions, we can say that option (d) will be the correct Answer.

Answer 52: (C)

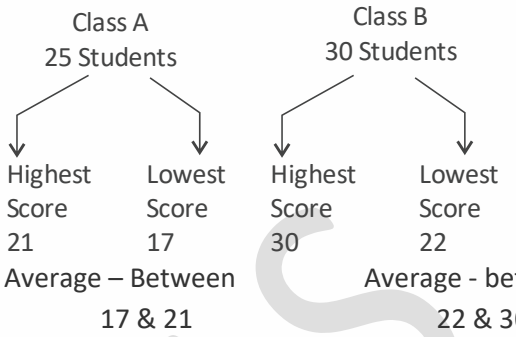
Let unit's digit = x
tens digit = y
Hundred's digit = z
Number = 100z + 10y + x
as the numbers is multiple of 3 so we can say x + y + z will also be divisible by 3.
Just of understanding we can write the number in the below form.
Z Y X
Now the possible combination of such numbers.

1. Z Y X – 100 z + 10 y + x
2. Z X Y – 100 z + 10x + y
3. Y X Z – 100 y + 10 x + z
4. Y Z X – 100 y + 10 z + x
5. X Y Z – 100 x + 10 y + z
6. X Y Z – 100 x + 10 z + y

adding $\underbrace{222(x+y+z) = S}_{74 \times 3 (\text{Multiple of } 3)}$

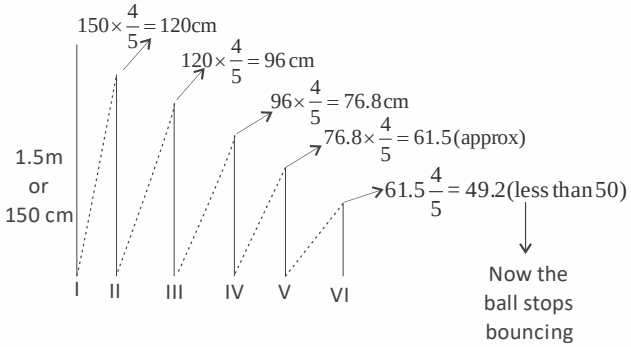
So, we can say that 'S' is always divisible by 74 & 9
So, option (C) is the correct answer.

Answer 53: (A)



According to the question 4 Students are shifted from Class A to class B.
Condition - I
Let 4 students of Maximum age ie 21 years are shifted from A to B then in that case average of these 4 students is less than the average of class b so they will definitely decrease the average score of class – B.
Condition – 2
Case (a) – let all 4 students who are shifted from A to B are of 21 years then average will be decreased.
Case (b)- let all 4 students who are shifted from A to B are of 17 years then average will be increased.
So according to condition 2 there can be 2 possibilities.
Considering both the conditions we can say that only option (a) is the correct answer.

Answer 54: (C)



So, correct answer will be option (C)

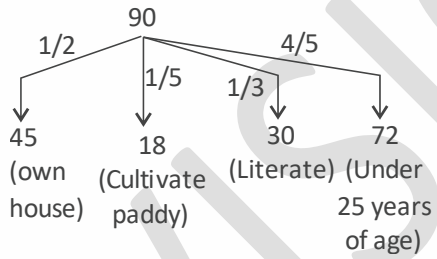
Answer 55: (D)

Integers from 700 to 800 having sum of digits as 10 = 703, 730, 712, 721
Integers from 801 to 900 having sum of digits as 10 = 802, 820, 811

Integers from 901 to 1000 having sum of digits as 10 = 901, 910
So, total number of Integers = 9
Hence, option (D) is the correct answer.

Answer 56: (C)
Statement 1:
x + x + 1 + x + 2 + x + 3 + x + 4 = 100
5x + 10 = 100
x = 18
18 + 19 + 20 + 21 + 22 = 100
(Statement 1 is correct)
Statement 2:
x (x + 1) (x + 2) = x + x + 1 + x + 2
$x(x^2 + 2x + x + 2) = 3x + 3$
$x^3 + 2x^2 + x^2 + 2x = 3x + 3$
$x^3 + 3x^2 + 2x = 3x + 3$
$x^3 + 3x^2 - x = 3$
Put x = 1
1 + 3 – 1 = 3
So, x = 1
1 × 2 × 3 = 1 + 2 + 3
Considering the above solution, we can say that option (c) is the correct answer.

Answer 57: (B)
Let the total number of villagers be 90



Except option (B) No other option statement is certain.
Hence, option (B) will be the correct Answer.

Answer 58: (C)
Let unit's digit = x & Ten's digit = y
Number = 10y + x
Number = 10x + y
When digits Interchanged
According to the question
10y + x – 10x – y = 54
9y – 9x = 54
y – x = 6
10x + y – 10y – x = 54
9x - 9y = 54
x – y = 6
$\Rightarrow (x+y)^2 = (x-y)^2 + 4x,y$
Product
Considering the solution, we can say that option (C) is correct.

Answer 59: (D)
Property – If a number is in the form of xxxxxx (mean 6 same digits) then that number will definitely be divisible by 11
So according to the question & the options we can say that the product of number & 7 will definitely have 6 ones.
So, answer should be divisibly by 11.
Divisibility of 11 – Sum of odd placed number – sum of even placed number should be zero or difference should be divisible by 11.
Option (D) 1 5 8 7 3
(1 + 8 + 3)- (5 + 7) = 0
Hence, option (D) is the correct answer.

Answer 60: (C)

Jay	Vijay
3 pens + 5 pencils =	2 pens + 7 Pencils.

1 pen = 2 pencil.
So, we can say that option (c) is the correct answer.

Answer 61: (B)

Initial Amount they had.	X	Y	Z
Condition – I	X + 40	Y – 40	Z/2
Condition-II	X + 40 =	Y =	Z-40

From condition – 1 $y - 40 = \frac{z}{2}$ or 2y–80=
2y – z = 80 ..... (i)
From condition – 2 Y = z – 40 or
y – z = - 40 ..... (ii)
(i)----- (ii)

$$\left.\begin{array}{ll} & y=120 \\ So & z=160 \\ \& & x=80 \end{array}\right\} x+y+2=360$$

Hence option (B) is the correct Answer.

Answer 62: (C)
3P + 4P + PP + PP = RQ2
Using the concept of unit digit we can say that P can be only 3 & 8 because when they are added 4 times then unit digit will be 2.

When P = 3	When P = 8
33	38
43	48
33	88
+33	88
142	262

A.M of 142 & 262

$= \frac{142+262}{2}$

$= \frac{404}{2} = 202$

Hence, option (C) is the correct answer.

Answer 63: (B)

(PQ) × 3 = R 55

Here, if we take Q = 5, then only after multiplication by 3 the units place will also be 5.

P5 × 3 = R55

Again, putting P = 8, we get 85 × 3 = 255

So, P = 8

Q = 5

R = 2

Hence, (P + R) ÷ Q

= (8 + 2) ÷ 5 = 2

Hence option (B) is the correct answer.

Answer 64: (C)

Whole numbers from 1 to 100 in which one digit is 7 = 7, 17, 27, 37, 47, 57, 67, 70, 71, 72, 73, 74, 75, 76, 77, 78 , 79, 87, 97.

Numbers divisible by 7 of these = 7, 70, 77

Numbers not divisible by 7 = 19-3 = 16

Answer 65: (D)

The single digit number is 9 from 1 to 9.

So, digit used single-digit number = 9 ×1=9

The two digit number is 90 from 10 to 99.

So, digits used in two-digit numbers= 90×2=180

The three digit number is 253 from 100 to 352.

So, digits used in three digit numbers= 253×3 = 759

Total digits used = 9+180+759 = 948

Answer 66: (A)

Integers from 500 to 600 having sum of digits as 10 = 523, 532, 514, 505, 541, 550.

Integers from 600 to 700 having sum of digit as 10 = 613, 631, 640, 604, 622.

Integers from 700 to 800 having sum of digit as 10 = 703, 730, 712, 721.

Integers from 801 to 900 having sum of digits as 10 = 802, 820, 811.

Integers from 901 to 1000 having sum of digit as 10 = 901, 910

So, total numbers of integers = 20

Answer 67: (C)

Now, for 99 to 200, 6 will come at unit's place 10 times.

i.e. 106, 116, 126,……196.

For 201-300 : 6 will come at the unit's place 10 times.

i.e. 206, 216, 226,……296.

Similarly, will be the case with number sets of 301-400, 401-500 etc.

Hence, the number of times that 6 will comes at unit's place between 99 to 1000= 10 × 9 = 90.

$$\begin{bmatrix} 90-200 \rightarrow 10 \\ 201-300 \rightarrow 10 \\ . \\ . \\ . \\ 90-1000 \rightarrow 10 \end{bmatrix} \quad 10\times 9 = 90$$

Answer 68: (D)

Whole numbers from 1 to 50 in which one digit is 3 are 3, 13, 23, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 43.

Numbers divisible by 3 of these = 3, 30, 33, 36, 39

Numbers not divisible by 3 = 14 - 5 = 9

Answer 69: (D)

9 pages from 1 to 9 will require 9 digits;

90 pages from 10 to 99 will require 90×2 = 180 digits ;

200 – (90+9) = 101 pages will require 101×3 =303 digits.

∴ The total number of digits required is 9 + 180 + 303 = 492.

Answer 70: (B)

For 99 to 200, 7 will come at unit's place 10 times.

i.e. 107, 117, 127, 137,……197.

For 201 to 300, 7 will come at unit place 10 times.

i.e. 207, 217, 227……297.

Similarly, will be the case with number sets of 301-400 and 401-500 etc.

Hence, the number of times that 7 will comes at unit's place between 99 to 500 = 10 × 4 = 40.

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