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Harshal Agrawal is a renowned expert in the field of Quantitative Aptitude and has dedicated his career to helping students and professionals master this essential skill. He has done both his BTech and MTech from IIT BHU, Varanasi. He has cleared many competitive exams like CAT (99+ percentile twice), IIT, AIEEE, BITSAT, GATE, IBPS PO and RRB PO. Since his days at IIT, he has taught Mathematics and Quantitative Aptitude to aspirants for IIT JEE, UPSC, CLAT, CAT, IBPS, and SBI. His unique way of solving questions with the easiest basic and diagrammatic approach is lovingly appreciated by students. Currently, he is the educator of Quantitative Aptitude for Bank Exams at his own platform Learning Niti and provides free education to banking and CAT exam aspirants on his YouTube channel, "Learning Capsules - Harshal Agrawal". The idea behind his thought about teaching is "meri padhaai mere ghar walo ne karaa di hai, ab us padhaai se kai gharon mein naukriyaa laani hain, kai saare bacchon ko kaabil banana hai, jisse unke parivaar acchi zindagi jii sakein"

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Chapter

1

Number System

Type : 1
Questions Based on Definitions or Classification

Bank Clerk

1. If P is a two Prime number, what is the value of?
I. When P is divided by 4 and remainder is 3.
II. P is 2 more than multiple of 7.
(A) 70 (B) 59
(C) 79 (D) 56
(E) None of these
[RRB Office Scale-1, 2020]

2. Three consecutive positive even numbers are such that thrice the 1st number exceeds double the 3rd by 2, then the 3rd number is :
(A) 12 (B) 16
(C) 14 (D) 10
(E) None of these
[RRB Assistant 2020]

3. If *abc* is *a* 3-digit number greater than 600 such that 2-digit number *ab* is divisible by 9, 2-digit number *ac* is divisible by 13, and 2-digit number *bc* is divisible by 7, then find the product of digits of the 3-digit number *abc*. (*a*, *b* and *c* are all distinct).
(A) 112
(B) 90
(C) 120
(D) Either *a* or *b*
(E) Either *a* or *c*
[IBPS RRB Office Assistant 2019]

4. If P = 1 + Z, where, Z is the product of four consecutive positive integers, then which of the following is/are true ?
I. P is odd
II. P is prime
III. P is a perfect Square
(A) I and III only
(B) I and II only
(C) I only
(D) Either I and II
(E) None of these
[RRB Assistant 2018]

5. A number is interesting if on adding the sum of the digits of the number and the product of the digits of the number, the result is equal to the number. What fraction of numbers between 10 and 100 (both 10 and 100 included) in interesting ?
(A) 0.1 (B) 0.11
(C) 0.16 (D) 0.22
(E) 0.33
[IBPS Clerk Preliminary Solved Paper 2017]

6. When you reverse the digits of the number 13, then number increases by 18. How many other two-digit numbers increase by 18 when their digits are reversed ?
(A) 7 (B) 8
(C) 6 (D) 5
(E) 10
[IBPS Clerk Pre 2017]

7. '*mn*' is a two-digit prime number such that one of its digits is 3. If the absolute difference between the digits of the number is not a factor of 2, then how many values can '*mn*' assume ?
(A) 3 (B) 8
(C) 6 (D) 5
(E) 7
[SBI JA&JAA Bank Clerk Pre Solved Paper 2017]

8. If a number is multiplied by three-fourth of itself, the value thus obtained is 10800. What is that number ?
(A) 210 (B) 180
(C) 120 (D) 160
(E) 140
SBI JA & JAA Bank Clerk Preliminary Solved Paper 2016

9. By how much is 3/4th of 52 is less than 2/3rd of 99 ?
(A) 27 (B) 33
(C) 39 (D) 29
(E) 55
RBI Assistant Prelim Solved Paper 2016

10. There are some students in the class and number of candies received by each student is one-seventh of the total student in the class. If the number of student in the class becomes one-fifth then each students gets 25 candies. Find the total number of candies distributed in the class ?
(A) 177 (B) 175
(C) 196 (D) 174
(E) 198
IBPS Clerk Preliminary Solved Paper 2016

11. If three-fourth of a number is subtracted from the number; the value so obtained is 163. What is that number ?
(A) 625 (B) 562
(C) 632 (D) 652
(E) None of these
SBI JA & JAA Bank Clerk Preliminary Solved Paper 2016

Bank PO

12. M, N and O are three consecutive odd numbers in ascending order. If the value of three times M is 3 less then two times O, find the value of O.
(A) 11 (B) 7
(C) 5 (D) 9
(E) 12
[RRB PO Pre 2020]

13. Let XYZ be *a* three-digit number, where (X + Y + Z) is not a multiple of 3. Then (XYZ + YZX + ZXY) is not divisible by :
(A) 3 (B) 9
(C) 37 (D) $x + y + 21$
(E) 45
[RRB PO Pre 2019]

Type : 2
Dividend = Divisor × Quotient Remainder

Bank Clerk

14. Arka Pratap divides a certain number by 5, 7 and 8 successively, the remainders are 2, 3 and 4 respectively. What will be the remainder if the order of the division is reversed ?
(A) 6,5 and 2 (B) 5, 5 and 2
(C) 4, 5 and 2 (D) 2, 5 and 4
(E) None of these
SBI Clerk (Junior Associates) Main Solved Paper 2019

15. When 3,626 is divided by the square of a number and the answer so obtained is multiplied by 32, the final answer obtained is 2,368. What is the number ?
(A) 7 (B) 36
(C) 49 (D) 6
(E) None of these
IBPS RRB office Assistant. (Math PurPose) Main Solved Paper 2018

Type : 3
Divisibility Rule

Bank Clerk

16. The digits of a three-digit number N are written in the reverse order to form another three-digit number M. If M > N and M-N is perfectly divisible by 7, then which of the following is necessarily true ?
(A) 106 < N < 305 (B) 100 < N < 299
(C) 118 < N < 317 (D) 112 < N < 311
(E) None of these
[RRB Assistant 2017]

Bank PO

17. Consider the following statements :
I. 7710312401 is divisible by 11.
II. 173 is a prime number.
Which of the statements given above is/ are correct ?
(A) Only I (B) Only II
(C) Both I and II (D) Neither I nor II
(E) None of these
[RRB PO Pre Exam. 2020]

18. A six-digit number is formed by repeating a three-digit number; for example, 256, 256 or 678, 678 etc. Any number of this form is always exactly divisible by :
(A) 7 only (B) 11 only
(C) 13 only (D) 1001
(E) None of these
[IBPS PO Main Exam 2017]

Type : 4
Questions Based on Sum of Natural Numbers

Bank Clerk

19. If k and p are integers divisible by 5, which of the following is not necessarily true ?
(A) $k - p$ is divisible by 5
(B) $k^2 - p^2$ is divisible by 25
(C) $k + p$ is divisible by 10
(D) $k + p$ is divisible by 20
(E) None of these
[RRB Assistant 2019]

20. Let a, b and c be distinct integers, that a and b are odd and positive, and c is even and positive. Which one of the following statements cannot be true ?
(A) abc^2 is odd
(B) $(a - b)^2 c$ is even
(C) $(a - b)(b + c)(a + b - c)$ is odd
(D) $(a + b - c)(a + b)$ is even
(E) None of these
[SBI Clerk 2019]

21. Let a and b be positive integers such that a is prime and b is composite. Then,
(A) $b - a$ cannot be an even integer
(B) $(a + b)/a$ cannot be an even integer
(C) ab cannot be an even integer
(D) $(a + b)$ is an integer
(E) None of these
[SBI Clerk 2018]

22. If 6 marks are awarded to right answer and 3 marks penalty for wrong answer. Then Prabhat's score was 120. If he attempted 50 questions then find number of correctly attempted questions ?
(A) 30 (B) 42
(C) 48 (D) 35
(E) 38
IBPS Clerk Prelim Solved Paper 2018

23. Sum of 4 consecutive even numbers are greater than three consecutive odd numbers by 81. If sum of least odd and even number is 59, then find the sum of largest odd and even numbers.
(A) 69 (B) 71
(C) 73 (D) 67
(E) None of these
IBPS Clerk Prelim Solved Paper 2017

24. The difference between the sum of four consecutive odd numbers and three consecutive even numbers together is 20. Also, the largest even number is 5 more than the largest odd number. What is the sum of the smallest odd number and the smallest even number ?
(A) 77 (B) 71
(C) 879 (D) 83
(E) Cannot be determined
IBPS Clerk Main Solved Paper 2016

25. Pravin purchased 25 kg of rice at the rate ₹45 per kg and 12 kg of pulses at the rate of ₹28 per kg. What is the total amount that he paid to the shopkeeper ?
(A) ₹1,466 (B) ₹1,426
(C) ₹1,461 (D) ₹1,471
(E) None of these
SBI JA & JAA Bank Clerk Preliminry Solved Paper 2016

26. The sum of five consecutive numbers is 190. What is the sum of the largest and the smallest number ?
(A) 75 (B) 77
(C) 76 (D) 73
(E) None of these
SBI JA & JAA Bank Clerk Preliminary Solved Paper 2016

Type : 5
Remainder Theorem

Bank Clerk

27. The numbers 1 to 29 are written side by side as follows 1234567891011.....28 29. If the number is divided by 9, then what is the remainder ?
(A) 3 (B) 1
(C) 0 (D) 6
(E) None of these
[SBI Clerk 18-10-2023 Shift-1]

Type : 6
Questions Based on Number of Digits

Bank Clerk

28. In a six-digit number, the sixth, that is, the rightmost, digit is the sum of the first three digits, the fifth digit is the sum of first two digits, the third digit is equal to the first digit, the second digit is twice the first digit and the fourth digit is the sum of fifth and sixth digits. Then, the largest possible value of the fourth digit is :
(A) 237145 (B) 121734
(C) 215347 (D) 541732
(E) None of these
[IBPS Clerk 2022]

29. What is the value of P ?
I. P and Q are unequal even integers, less than 10, and P/Q is an odd integers.
II. P and Q are even integers, each less than 10, and product of P and Q is 12.
(A) Only I
(B) Only II
(C) Either I or II
(D) Both together
(E) Neither I nor II together
[IBPS Clerk 2021]

30. If x and y are consecutive positive integers, such that $x < y$,
I. $(x + 1)(y - 1) = xy$
II. $(x + y)^2$ leaves a remainder of 1 when divided by 8.
(A) Only I
(B) Only II
(C) Either I or II alone
(D) Both together
(E) Neither I nor II together
[IBPS Clerk (Mains) 2021]

Bank PO

31. The ten's digit of a three digit number is 3. If the hundredth and unit digits are intercharged and the number thus formed is 396 more than the previous one. The sum of unit digit and hundred digit is 14, then what is the number?
(A) 480 (B) 539
(C) 593 (D) 935
(E) None of these
[IBPS Po Prelim Exam, 15-10-2017]
[IBPS Po (Pre), 07-10-2017]

Type : 7
Factorial Rule

Bank Clerk

32. The integers 1, 2 ....., 40 are written on a blackboard.

The following operation is then repeated 39 times. In each repetition, any two numbers, say a and b, currently on the blackboard are erased and a new number $a + b - 1$ is written. What will be the number left on the board at the end ?

(A) 820 (B) 821
(C) 781 (D) 819
(E) None of these

[SBI Clerk 2021]

Bank PO

33. Let N = 1! + 2! + 3! + 4! + ... + 200! Which one about N is true ?

(i) N is even (ii) N is odd
(iii) N/2 is odd
(A) Only (i) (B) Only (ii)
(C) Only (i) & (iii) (D) Only (iii)
(E) None of these

[IBPS PO Main Exam 2017]

Type : 8
Miscellaneous

Bank Clerk

34. If the numerator of a certain fraction is increased by 80%, while the denominator is increased by 200%, then the ratio of the numerator and denominator becomes 21 : 50, what will be the actual fraction?

(A) 5/7 (B) 7/8
(C) 7/10 (D) 8/11
(E) 5/8

SBI Clerk 19/11/22 Shift-1

35. The numerator of a fraction is decreased by 25% and the denominator is increased by 250%. If the resultant fraction is $\frac{6}{5}$, What is the original fraction ?

(A) $\frac{25}{5}$ (B) $\frac{24}{5}$
(C) $\frac{27}{6}$ (D) $\frac{28}{5}$
(E) $\frac{30}{11}$

IBPS Clerk Preliminary Solved Paper 2016

36. There are two integers 34041 and 32506, when divided by a three-digit integer n, leave the same remainder. What is the value of n ?

(A) 298 (B) 307
(C) 461 (D) 245
(E) can't be determined

[SBI Clerk 2020]

Bank PO

37. The question consists of two statements numbered "I" and "II" given below it. You have to decide whether the data provided in the statements are sufficient to answer the question or not and choose the correct option accordingly.

There are seven consecutive natural numbers. Find the average of the numbers.

Statement I: Second largest number is 62.5% more than the smallest number.

Statement II: Largest number is 6 more than the smallest number.

(A) The data in statement I alone is sufficient to answer, while the data in statement II alone is not sufficient to answer the question.
(B) The data in statement II alone is sufficient to answer, while the data in statement I alone is not sufficient to answer the question.
(C) The data either in statement I alone or in statement II alone are sufficient to answer the question.
(D) The data given in both statements I and II together are not sufficient to answer the question.
(E) The data in both statements I and II together are necessary to answer the question.

[RRB PO Pre. Exam, 06-08-2023 (Shift-4)]

38. a, b and c are three integers. The sum of and b is 61. If b is divided by a, then the quotient is 2 and the remainder is 7. If $c^n - 2$ is the largest value of the negative integer. Then which of the following will definitely lie within $(c^n - n + a)$ and $(b - a)$?

(A) 15 (B) 11
(C) 28 (D) 23
(E) 43

[IBPS PO MAIN EXAM, 2022]

39. When the digits of a two digit natural number are interchanged then original number is greater than four times the new number so obtained. How many such natural numbers satisfy the given condition ? Ignore the numbers which have '0' in their unit place.

(A) 2 (B) 3
(C) 5 (D) 6
(E) 7

[IBPS PO MAIN EXAM, 2018]

Direction (Q. No. 40 and 41)

Answer the question based on the information given below: Solve the given equations and answer the questions based on it.

A. $(a \times a) - 3a - \sqrt{(4a^2)} = -6$

B. $\left((b^2) - \sqrt{81b^2}\right) = -4 \times (5)$

C. $\left(c^2 \times \sqrt{625c^6}\right) / 5c^3 + (4 \times 7) = 39c$

D. $d^2 - (3 \times 5)d = \{7 \times (-8)\}$

[IBPS PO MAIN EXAM, 2022]

40. Find the LCM of all the larger roots of the equations A, B, C and D.

(A) 720 (B) 120
(C) 360 (D) 840
(E) None of these

41. In which of the given equation (s) the difference between larger root and smaller root is 1?

(A) Only B and D
(B) Only A and B
(C) Only A and D
(D) Only A, B and D
(E) All A, B, C and D

Solutions

1. (C) I. P is divided by 4, and remainder is 3.

$P = 4x + 3$
$x = 2$
$P = 8 + 3$
$P = 11$

And $x = 4$
$P = 16 + 3$
$P = 19$

Hence, this statement is not sufficient.

II. $4x + 3 = 7y + 2$
$4x - 7y = -1$
$4x = 4y + 3y - 1$
$4x - 4y = 3y - 1$
$x - y = \frac{3y-1}{4}$

Put, $y = 3$,

$x - 3 = \frac{9-1}{4}$

$x = 3 + 2 = 5$
$P = 23$
$y = 11$
$x = 11 + 8 = 19$
$P = 79$

Hence, combination also does not help.

2. (C) Let the three consecutive positive even integer be x, $x + 2$ and $x + 4$
ATQ,
$(3.\ x) - 2 = 2(x + 4)$
$3x - 2 = 2x + 8$
$3x - 2x = 10$
$x = 10$
Therefore, $x = 10$ and the other two integer are :
$x + 2 = 10 + 2 = 12$
And $x + 4 = 10 + 4 = 14$
Hence, the third number is 14.

3. (D) Let three digit number = abc
2 digit number ab is divisible by 9.
Then 2 digit number ab
= 18, 27, 36, 45, 54, 63, 72, 81, 90, 99
And 2 digit number ac is divisible by 13
Then 2 digit number ac
= 13, 26, 39, 65, 78, 91.
Again, 2 digit number bc is divisible by 7.
Then 2 digit number bc
= 28, 35, 42, 49, 91
Rearranging the 3 digit number abc
= 183 ×
276 ×
369 ×
542 ✓
635 ✓
728 ✓
901 ×
991 ✓
(a, b and c are not all distinct)
The product of 3 digit number abc
$= 6 \times 3 \times 5 = 90$
$= 7 \times 2 \times 8 = 112$

4. (A) Let four consecutive positive integer
= 1, 2, 3, 4
The product of four consecutive positive integer = Z
$Z = 1 \times 2 \times 3 \times 4$
$= 24$
$P = 1 + Z$
$P = 1 + 24 = 25$
P is odd and perfect square P is not Prime number.
Hence, I and III are true statement.

5. (A) Let the numbers be the form $10x + y$
According to question,
$10x + y = x + y + xy$
$9x = xy$
$\therefore \quad y = 9$
The numbers are 19, 29, 39, 49, 59, 69, 79, 89 and 99 total to 9 numbers
Hence, the required fraction $= \frac{9}{91}$
$= 0.099 = 0.1$

6. (C) Let $10x + y$ be a two digit number, where x and y are positive single digit integers and $x > 0$
Its reverse $= 10y + x$
Now, $10y + x - 10x - y = 18$
$9(y - x) = 18$
$y - x = 2$
Thus y and x can be (1, 3), (2, 4), (3, 5), (4, 6), (5, 7), (6, 8) and (7, 9)
$\therefore$ Other than 13, there are 6 such numbers.

7. (A) Since mn is a two digit Prime numbers and one of its digit is 3.
It can let any of the value's among 13, 23, 31, 37, 43, 53, 73 and 83.
Difference between the digits of the number is not a factor of 2.
Number that satisfy the aforementioned. condition are 37, 73 and 83.
Hence, the number of values that mn is 3.

8. (C) Consider the number as x.
A.T.Q.
$\Rightarrow \quad x \times \frac{3}{4}x = 10800$
$\Rightarrow \quad x^2 = 10800 \times \frac{4}{3} = 3600 \times 4$
$= 14400$
$\therefore \quad x = \sqrt{14400} = 120$

9. (A) $\frac{3}{4}$ of $52 = 52 \times \frac{3}{4} = 39$
$\frac{2}{3}$ of $99 = 99 \times \frac{2}{3} = 66$
Hence, required value = 66 – 39 = 27.

10. (B) Let the number of students in the class = x
According to question $x \times \frac{x}{7} = \frac{x}{5} \times 25$
$x = 35$
Hence, Required number of candies
$= \frac{35}{5} \times 25 = 175$

11. (D) Consider the number as x.
A.T.Q.,
$\Rightarrow \quad x - \frac{3x}{4} = 163$
$\Rightarrow \quad \frac{4x - 3x}{4} = 163$
$\Rightarrow \quad x = 163 \times 4 = 652$
Hence, required number is 652.

12. (D) Let M, N and O are three consecutive odd number are a, $a + 2$, $a + 4$ respectively.
ATQ,
$3a + 3 = 2a + 8$
$3a - 2a = 8 - 3$
$a = 5$
The value of O
$= a + 4$
$= 5 + 4 = a$
Hence, option (D) is correct.

13. (B) Number of XYZ
$= 100x + 10y + z$
Number of YZX
$= 100y + 10z + x$
Number of ZXY
$= 100z + 10x + y$
XYZ + YZX + ZXY
$100x + 10y + z + 100y + 10z + x + 100z + 10x + y$
$= 111x + 111y + 111z$
$= 111\ (x + y + z)$
It is clear that 111 is the common factor.
So, XYZ + YZX + ZXY is divisible by 111.
Factor of 111 are 3 and 37.
But it is given that $(x + y + z)$ is not multiple of 3.
(XYZ + YZX + ZXY) is not divisible by 9.

14. (B) Let the certain number = N
According to question,
$N = 5\ [7(8x + 4) + 3] + 2$
$= 35\ (8x + 4) + 15 + 2$
$= 35\ (8x) + 140 + 17 = 280x + 157$
When this is divided by 8, quotient $= 35x + 19$ and remainder = 5
When $(35x + 19)$ is divided by 7, quotient $= 5x + 2$ and remainder = 5
When $(5x + 2)$ is divided by 5, quotient = x and remainder = 2.
Then, required the remainder is 5, 5 and 2.

15. (A) Let the number be x.
A.T.Q.,
$\frac{3626}{x^2} \times 32 = 2368$
$\Rightarrow \quad x^2 = \frac{3626 \times 32}{2368}$
$\Rightarrow \quad x^2 = \frac{116032}{2368}$
$\therefore \quad x = \sqrt{49} = 7$

16. (A) Let N = xyz be a digit a number
Then N can be expressed as
$N = 100x + 10y + z$
And is reverse of x
$M = 100z + 10y + x$
$M - N = 100z + 10y + x$

$-100x-10y-z$

$=99z-99x$

$=99(z-x)$

As, M – N is divided by 7, and 99

$\therefore \quad (z-x)=7$

Also x cannot be zero

$x=1, 2$ and $z=8, 9$

M – N = 99 × 7 = 693

Smallest value of N can be 108

Largest value of N can be 299

Corresponding value of M are

108 + 693 = 801

And 299 + 693 = 992

Thus 106 < A < 305 will be correct option.

17. (C) I. Any number in order to get completely divided by 11, the difference between the sum of even place digits and the sum of odd place digits must have equal to either 0 or the multiple of 11. In 7710312401, difference between sum of even place digits and the sum of odd place digit is 0. So, it is divisible by 11.

II. To check divisibility of 173, we can divide the number by all the prime numbers from 2 to 13. It is not divisible by 2, 3, 5, 7, 11 and 13. So, it is a prime number. Hence, both statements I and II are correct.

18. (D) Let the three digit number be abc

then 6 digit number $abcabc$

$=100000a+10000b+1000c+100a+10b+c$

$=100100a+10010b+1001c$

$=1(100a+10b+c)1001$

So, this number will be always divisible by 1001 and its factors.

$1001=7\times11\times13$

Hence, divisible by 7, 11, 13, 77, 91, 143 and 1001.

19. (C) If k and p are integers divisible by 5

Let, $k=15$ and 20

Then each one of k and p is divisible by 5.

But $(k+p)$ is not divisible by 10.

$\because$ $(k+p)$ is divisible by 10 is not true.

20. (A) Let, some suitable values for example

$a=1, b=3$ and $c=2$

Now substitute in the options and check

Option (A)

abc^2 is odd

$=1\times3\times2^2$

$=1\times3\times4$

$=12$ (even) (wrong)

Option (B)

$(a-b)^2 c$ is even

$=(1-3)^2\times2$

$=4\times2$

$=8$ (even) (correct)

Option (C)

$(a-b)(b+c)(a+b-c)$ is odd

$=(1-3)(3+2)(1+3-2)$

$=-2\times5\times2$

$=-20$ (even) (correct)

Option (D)

$(a+b-c)(a+b)$ is even

$=(1+3-2)(1+3)$

$=2\times4$

$=8$ even (correct)

Hence, option (A) is false.

21. (D) Choose one Prime number & one Composite number

Option (D) $(a+b)$ is an integer

Prime number = 2

And Composite number = 4

$\Rightarrow 2+4=6$ which is an integer.

option (D) is correct.

Option (C) ab cannot be an even integer. $2\times4=8$ is an even integer

Hence, Option (C) is wrong.

Option (B) : $\dfrac{a+b}{a}$

$=\dfrac{2+6}{2}=4$ which is an even integer

Option (B) is wrong.

Option (B) : $(b-a)$

$(6-2)=4$ which is an even integer

Option (A) is wrong.

22. (A) Let number of correct questions = x

Then, Incorrect questions = $(50-x)$

ATQ,

$\Rightarrow \quad x\times6-(50-x)\times3=120$

$\Rightarrow \quad 6x-(150-3x)=120$

$\Rightarrow \quad 6x-150+3x=120$

$\Rightarrow \quad 9x=270$

$\Rightarrow \quad x=30$

So number of correctly atttempted question of prabhat is 30.

23. (A) Let the least even number be x.

Then,4 consecutive even numbers be $x, x+2, x+4$ and $+6$ respectively.

Let, least odd number be y

Then, 3 consecutive odd numbers be $y, y+2$ and $y+4$

A.T.Q.,

$\Rightarrow [x+(x+2)+(x+4)+(x+6)]-[y+(y+2)+(y+4)]=81$

$\Rightarrow 4x+12-3y-6=81$

$\Rightarrow 4x-3y=81-12+6$

$\Rightarrow 4x-3y=75$ ...(i)

Now, sum of smallest even and odd numbers $(x+y)=59$ ...(ii)

Solving equation (i) and (ii), we get $x=36, y=23$

Now sum of largest even number and largest odd number = $(x+6)+(y+4)=(36+6)+(23+4)=42+27=69$

24. (A) Consider the odd numbers as $x, x+2, x+4, x+6$ and the even numbers as $y, y+2, y+4$.

A.T.Q., $(4x+12)-(3y+6)=20$

And $(y+4)-(x+6)=5$

$\therefore \quad 4x-3y=14$ ...(i)

and $\quad -x+y=7$ ...(ii)

Solving eqn. (i) and (ii), we get $x=35$ and $y=42$

Required sum = 35 + 42 = 77

25. (C) Total amount paid = Total price of rice + Total price of pulses = ₹ $(25\times45+12\times28)$

= ₹ (1125 + 336)

= ₹1,461

26. (C) Consider the lowest number as x.

A.T.Q.,

$x+(x+1)+(x+2)+(x+3)+(x+4)=190$

$\Rightarrow \quad x=\dfrac{190-10}{5}=36$

$\therefore$ Required sum = $x+x+4$

$=36+40=76$

27. (A) Sum of the digit of the number

= 1 + 2 + 3 + 4 + ... up to last digit

$=45\times3+30=165$

165 when divided by 9 leave remainder 3.

28. (B)

Case 1	a	_	a	_	_	_
Case 2	a	$2a$	a	_	_	_
Case 3	a	$2a$	a	_	$3a$	_
Case 4	a	$2a$	a	_	$3a$	$4a$
Case 5	a	$2a$	a	$7a$	$3a$	$4a$

Then, the possible number of a = 1

Number → 1 2 1 7 3 4

The resultant number is 121734

29. (B) I. P and Q are unequal even integer. P and Q can be among 2, 4, 6 and 8. It is given that P/Q is an odd integer. So, P must be greater than Q.

If we take different pair of (P, Q) among (8, 2), (8, 4), (8, 6), (6, 2), (6, 4), (4, 2) only (6, 2) satisfies the above condition of P/Q being an odd integer.

So, we can uniquely determine the values of P and Q which are 6 and 2 respectively.

II. The product of two even number, the possible is when the numbers are 2 and 6.
However we don't know any relation between P and Q.

30. (D) I. $(x + y)(y - 1) = xy$
$xy - x + y - 1 = xy$
$-x + y - 1 = 0$
$y - x = 1$
$y = x + 1$
Since x and y are consecutive positive integers and $x < y$ then $y = x + 1$ is true
II. $(x + y)^2$ leaves a remainder of 1 when divided by 8.
Since x and y are consecutive positive integers, one of them can be written as $2k$ and the other as C $2k + 1$ for some positive integer k

Therefore,
$x + y = 4k + 1$
$(x + y)^2 = (4k + 1)^2$
$= 16k^2 + 1 + 2 \times 4k \times 1$
$= 16k^2 + 8k + 1$
Since $16k^2 + 8k$ are multiple of 8.
We see that $(x + y)^2$ does leaves a remainder of 1 when divided by 8 ?
Statement I and Statement II are correct.

31. (B) Let digit be abc
Also, $b = 3$
So, according to question,
$(100c + 10b + a) - (100a + 10b + c) = 396$
$99c - 99a = 396$
$c + a = 4$ ...(i)
And it is given that
$c - a = 14$ ...(ii)
Solving (i) and (ii)
$c = 9$
$a = 5$
so, required number = 539

32. (C) $1 + 2 + 3 + ... + 40 = \frac{40 \times 41}{2} = 820$
Since each time any two numbers a and b are erased and a single new number $(a + b - 1)$ is writen. Hence, each one is subtracted and this process is repeated 39 time. Therefore, number left on the board at the end = 820 – 39 = 781.

33. (B) Since all the factorials except 1! Is even number hence required summation must be odd.

34. (C) let numerator of the fraction is x and denominator is y
then fraction will be $\frac{x}{y}$
Numerator increased 80%
so new numerator would be
$$x + \frac{80 \times x}{100} = \frac{9x}{5} \quad ...(i)$$
new denominator will be
$$y + \frac{200 \times y}{100} = 3y \quad ...(ii)$$
ATQ, we have
$$\Rightarrow \quad \frac{\frac{9x}{5}}{3y} = \frac{21}{50}$$
$$\Rightarrow \quad \frac{9x}{5 \times 3y} = \frac{21}{50}$$
$$\frac{3x}{5y} = \frac{21}{50}$$
$$\Rightarrow \quad \frac{x}{y} = \frac{7}{10}$$
So, original fraction is $\frac{7}{10}$.

35. (D) Let the original fraction be $x : y$
ATQ,
$$\frac{x - \frac{25x}{100}}{y + \frac{250y}{100}} = \frac{6}{5}$$
$$\Rightarrow \quad \frac{\frac{75x}{100}}{\frac{350y}{100}} = \frac{6}{5}$$
$$\Rightarrow \quad \frac{75x}{350y} = \frac{6}{5}$$
$$\Rightarrow \quad \frac{15x}{70y} = \frac{6}{5}$$
$$\Rightarrow \quad \frac{x}{y} = \frac{420}{75}$$
$$\Rightarrow \quad \frac{x}{y} = \frac{28}{5}$$
So, $\frac{28}{5}$ is the original fraction

36. (B) Let the common remainder be x. Then numbers $(34041 - x)$ and $(32506 - x)$ would be completely divisible by n.
Hence, the difference of the numbers $(34041 - x)$ and $(32506 - x)$ will also be divisible by n
or $(34041 - x - 32506 + x) = 1535$ will also be divisible by n.
Now, using options we find that 1535 is divisible by 307.

37. (A) Let 7 consecutive natural number be $x, x + 1, x + 2, x + 3, x + 4, x + 5, x + 6$
According to statement-I:
$\therefore \quad \frac{x \times 162.5}{100} = x + 5$
$162.5x = 100x + 500$
$x = 8$
$\therefore$ Statement-I is alone sufficient to answer, while the data in statement-II alone is not sufficient to answer the question.

38. (D) $a + b = 61$ ...(1)
$b - 2a = 7$ ...(2)
Subtracting equation (2) from equation (1)
$a + b - b + 2a = 61 - 7$
$3a = 54$
$a = 18$
Putting $a = 18$ in equation (1)
$18 + b = 61$
$b = 43$
Now largest value of negative integer = – 1
therefore, $c^n - 2 = -1$
$c^n = 1$
In this case the value of n can be either 0 or 1.
when $n = 0$
$c^n - n + a = c - 0 + 18$
$= 1 - 0 + 18$
$= 19$
when $n = 1$
$c^n - n + a = c^n - 1 + 18$
$= 1 - 1 + 18$
$= 18$
and $b - a = 43 - 18$
$= 25$
Hence, the value 23 definitely lies between 18 and 25.

39. (B) Let the digits of two digit number be x and y.
The number = $10x + y$
And reverse number = $10y + x$
According to given condition,
$(10x + y) > 4(10y + x)$
$10x + y - 40y - 4x = 0$
$6x - 39y > 0$
If we substitute y for 1, then the possible value of x is equal to or more than 7 *i.e.* 7, 8 and 9
Therefore 3 numbers are possible when y is 1 *i.e.*, (71), (81), (91)
Values greater than 1 are not possi-ble for y. So there are 3 possible numbers.

40. (D) A. $(a \times a) - 3a - \sqrt{4a^2} = -6$

$a^2 - 3a - 2a + 6 = 0$

$a^2 - 5a + 6 = 0$

$(a - 3)(a - 2) = 0$

$a = 3$ and 2

B. $b^2 - \sqrt{81b^2} = -4 \times 5$

$b^2 - 9b + 20 = 0$

$(b - 5)(b - 4) = 0$

$b = 5$ and 4

C. $\frac{c^2\sqrt{625c^6}}{5c^3} + (4 \times 7) = 39c$

$\frac{c^2 \times 25c^3}{5c^3} + 28 = 39c$

$5c^2 - 39c + 28 = 0$

$5c^2 - 35c - 4c + 28 = 0$

$5c(c - 7) - 4(c - 7) = 0$

$(5c - 4)(c - 7) = 0$

$c = 0.8$ and 7

D. $d^2 - (3 \times 5)d = 7 \times (-8)$

$d^2 - 15d + 56 = 0$

$(d - 8)(d - 7) = 56$

$d = 8$ and 7.

Larger roots of A, B, C and D are 3, 5, 7 and 8 respectively.

there, LCM of 3, 5, 7 and $8 = 3 \times 5 \times 7 \times 8 = 840$

41. (D) Difference in roots in

A = 3 – 2

= 1

Difference in roots in

B = 5 – 4

= 1

Difference in roots in

C = 7 – 0.8

= 6.2

Difference in roots in

D = 8 – 7

= 1

Therefore, Only A, B and D has difference of 1.

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