CA

Test-05

Sampurna 2.0 January 2025

Quantitative Aptitude

Q1 What value should come in place of question mark (?) in the following number series?
22, 42, 64, 88, ?
(A) 112 (B) 118
(C) 116 (D) 114

Q2 If the roots of the equation $x^2 - 8x + m = 0$ exceeds the other by 4, then the value of m is
(A) $m = 10$ (B) $m = 11$
(C) $m = 9$ (D) $m = 12$

Q3 In a certain code, NEWYORK is written as 111, how is NEWZEALAND written in that code?
(A) 112 (B) 106
(C) 119 (D) 105

Q4 One root of the equation:
$x^2 - 2(5 + m) + 3(7 + m) = 0$ is reciprocal of the other. Find the value of m.
(A) $\frac{-20}{3}$ (B) 7
(C) $\frac{1}{7}$ (D) $\frac{1}{17}$

Q5 If PLAY is codes as 8123 and RHYME is coded as 49367. What will be code of MALE?
(A) 6285 (B) 6217
(C) 6395 (D) 6198

Q6 If the ratio of the roots of the equation $4x^2 - 6x + p = 0$ is $1 : 2$, then the value of p is
(A) 1 (B) 2
(C) -2 (D) -1

Q7 Find the missing term
$P\ 3\ C;\ R\ 5\ F;\ T\ 8\ I;\ V\ 12\ L;$ _____ ?
(A) Y17O (B) X17M
(C) X17O (D) X16O

Q8 The cost prices of 3 pens and 4 bags is ₹324. and 4 pens and 3 bags is ₹257, then cost price of 1 bag is equal to
(A) ₹16 (B) ₹18
(C) ₹50 (D) ₹75

Q9 If $\alpha,\ \beta$ be the roots of $x^2 + x + 5 = 0$ then $\frac{\alpha^2}{\beta} + \frac{\beta^2}{\alpha} =$
(A) $\frac{16}{5}$ (B) 2
(C) 3 (D) $\frac{14}{5}$

Q10 In a certain code language, '253' means 'books are old', '546' means 'man is old' and '378' means 'buy good books'. What stands for 'are' in that code?
(A) 2 (B) 4
(C) 5 (D) 6

Q11 If roots of equation $x^2 + x + r = 0$ are α and β and $\alpha^3 + \beta^3 = -6$. Find the value of 'r'.
(A) $-\frac{5}{3}$ (B) $\frac{7}{3}$
(C) $-\frac{4}{3}$ (D) 1

Q12 If TAP is coded as SZO, then how is FRIEND coded?
(A) EQJDNC (B) EQHDMC
(C) GSIEND (D) None of above

Q13 If $a^2 + b^2 = 45$ and $ab = 18$, the $\frac{1}{a} + \frac{1}{b}$ is:
(A) $\pm\frac{1}{3}$
(B) $\pm\frac{2}{3}$
(C) $\pm\frac{1}{2}$
(D) None of these

Q14 4 tables and 3 chairs together cost ₹2,250 and 3 tables and 4 chairs cost ₹1950 . Find the cost of 2 chairs and 1 table.
(A) ₹550 (B) ₹1005

(C) ₹750 (D) None of these

Q15 If $2^{x+y} = 2^{2x-y} = \sqrt{8}$ then the respective values of x and y are
(A) $1, \frac{1}{2}$
(B) $\frac{1}{2}, 1$
(C) $\frac{1}{2}, \frac{1}{2}$
(D) None of these

Q16 If $DELHI$ is coded as $EFMIJ$ then $JAIPUR$ is coded as
(A) JQVSBK (B) QVSKBJ
(C) BJQVSK (D) KBJQVS

Q17 The quadratic equation $x^2 - 2kx + 16 = 0$ will have equal roots when the value of 'k' is
(A) ± 1 (B) ± 2
(C) ± 3 (D) ± 4

Q18 Find odd man out of the following:
4, 9, 256, 529, 573
(A) 529 (B) 9
(C) 573 (D) 256

Q19 If in a certain language HEALTH is coded as IFBMUI then what is the code for NORTH?
(A) OPSUI (B) OPUSI
(C) OUSPI (D) OIPSU

Q20 Find odd man out of the following:
$6,\ 9,\ 15,\ 21,\ 24,\ 28,\ 30$
(A) 28 (B) 21
(C) 24 (D) 30

Q21 If one root of $5z^2 + 13z + y = 0$ is reciprocal of the other, then the value of y is
(A) $\frac{1}{5}$ (B) $-\frac{1}{5}$
(C) 5 (D) -5

Q22 Find the roots of equation: $4^x \cdot 8^y = 128$ and $\frac{3^x}{27^y} = \frac{1}{3}$
(A) 2, 1 (B) -2, 1
(C) 2, -1 (D) 1, 2

Q23 A man wants to cut three lengths from a single piece of board of length 91 cm. The second length is to be 3 cm longer than the shortest and third length is to be twice as the shortest. What is the possible length for the shortest piece?
(A) 22 cm (B) 20 cm
(C) 15 cm (D) 18 cm

Q24 The number that comes next in the sequence $5.2,\ 4.8,\ 4.4,\ 4,\ \ldots\ldots$ is
(A) 3.3 (B) 3.6
(C) 3.8 (D) 4.2

Q25 The wrong term in the series:
$225,\ 196,\ 169,\ 144,\ 121,\ 100,\ 77,\ 64$ is
(A) 121 (B) 77
(C) 100 (D) 169

Q26 In the sequence, 80, 10, 70, 15, 60, 20, 50,.....
What number should come next?
(A) 25 (B) 30
(C) 40 (D) 55

Q27 What should come in place of question mark in number series;
$14,\ 25,\ 47,\ 91,\ ?,\ 355$
(A) 100 (B) 197
(C) 179 (D) 335

Q28 What is the next term of the series:
$6,\ 16,\ 44,\ 126,\ 370,\ ?$
(A) 1100
(B) 1250
(C) 1055
(D) None of the above

Q29 In a certain code RIPPLE is written as 613382 and LIFE is written as 8192. How will RIFFLE be written in that code?
(A) 618892 (B) 689912
(C) 619982 (D) 629981

Q30 If $\frac{3}{x+y} + \frac{2}{x-y} = -1; \frac{1}{x+y} - \frac{1}{x-y} = \frac{4}{3}$; then (x, y) is
(A) 2, 1 (B) 1, 2
(C) -1, 2 (D) -2, 1

Q31 If thrice of A's age 6 years ago be subtracted from twice his present age, the result would be equal to his present age. Find A's present age.

(A) 7 (B) 8
(C) 9 (D) 6

Q32 The roots of $x^3 + x^2 - x - 1 = 0$ are
(A) $(-1, -1, 1)$ (B) $(1, 1, -1)$
(C) $(-1, -1, -1)$ (D) $(1, 1, 1)$

Q33 If the roots of $(k-4)x^2 - 2kx + (k+5) = 0$ are coincident, then the value of k is
(A) 14 (B) 20
(C) 18 (D) 22

Q34 Find the odd one out of the following:
36, 20, 12, 8, 6, 4
(A) 20 (B) 4
(C) 36 (D) 12

Q35 If difference between the roots of the equation $x^2 - kx + 8 = 0$ is 4 then the value of k is
(A) 0 (B) ± 4
(C) $\pm 8\sqrt{3}$ (D) $\pm 4\sqrt{3}$

Q36 What value should come in place of question mark (?) in the following number series?
1,12,144,1728, ?
(A) 18024 (B) 9962
(C) 20736 (D) 21302

Q37 $10,\ 100,\ 200,\ 310,\ 430,\ ?$
(A) 560 (B) 540
(C) 550 (D) 590

Q38 The sum of the two numbers is 8 and the sum of their squares is 34. Taking one number as x form an equation in x and hence find the numbers. The numbers are
(A) (7, 10) (B) (4, 4)
(C) (3, 5) (D) (2, 6)

Q39 If CLOCK is coded as 34235 and TIME as 8679, then MOTEL is coded as
(A) 27894 (B) 72964
(C) 72894 (D) 77684

Q40 Find the quadratic equation whose sum of roots is 7 and product of roots is 12.
(A) $x^2 - 12x + 7 = 0$ (B) $12x^2 - x + 7 = 0$
(C) $x^2 - 7x + 12 = 0$ (D) $7x^2 - 12x + 1 = 0$

Q41 If thrice of A's age 6 years ago be subtracted from twice his present age, the result would be equal to his present age. Find A's present age.
(A) 7 (B) 8
(C) 9 (D) 6

Q42 What should come in place of question mark in number series;
14, 6, 4, 4, 8, ?
(A) 32 (B) 8
(C) 4 (D) 16

Q43 If CLOCK is coded 34235 and TIME is 8679. What will be the code of MOTEL?
(A) 72894 (B) 77684
(C) 72964 (D) 27894

Q44 The value of k for which the roots are equal of given equation, $4x^2 - 12x + k = 0$ is
(A) 144 (B) 9
(C) 5 (D) None of these

Q45 Let α and β be the roots of $x^2 + 7x + 12 = 0$. Then the value of $\left(\frac{\alpha^2}{\beta} + \frac{\beta^2}{\alpha}\right)$ will be
(A) $\frac{49}{144} + \frac{144}{49}$
(B) $\frac{7}{12} + \frac{12}{7}$
(C) $\frac{-91}{12}$
(D) None of the above

Q46 What comes next in the sequence:
$7,\ 10,\ 14,\ 19,\ 25,\ ?$
(A) 30 (B) 32
(C) 36 (D) 42

Q47 Find odd one out of the following:
$835,\ 734,\ 642,\ 751,\ 853,\ 981,\ 532$
(A) 751 (B) 853
(C) 981 (D) 532

Q48 If $x = m$ is one of the solution of the equation $2x^2 + 5x - m = 0$, the possible values of

m are

(A) $(0,\ 2)$ (B) $(0,\ -2)$

(C) $(0,\ 1)$ (D) $(1,\ -1)$

Q49 Solving equation $3x^2 - 14x + 8 = 0$, we get roots

(A) ± 4 (B) ± 2

(C) $4,\ \frac{2}{3}$ (D) None

Q50 Solve $x^3 - 6x^2 + 5x + 12 = 0$.

(A) $1,\ 3,\ 4$

(B) $-1,\ 3,\ 4$

(C) $1,\ 6,\ 2$

(D) $1,\ -6,\ -2$

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Answer Key

Q1	(D)	Q26	(A)
Q2	(D)	Q27	(C)
Q3	(D)	Q28	(A)
Q4	(A)	Q29	(C)
Q5	(B)	Q30	(B)
Q6	(B)	Q31	(C)
Q7	(C)	Q32	(A)
Q8	(D)	Q33	(B)
Q9	(D)	Q34	(B)
Q10	(A)	Q35	(D)
Q11	(A)	Q36	(C)
Q12	(B)	Q37	(A)
Q13	(C)	Q38	(C)
Q14	(C)	Q39	(C)
Q15	(A)	Q40	(C)
Q16	(D)	Q41	(C)
Q17	(D)	Q42	(A)
Q18	(C)	Q43	(A)
Q19	(A)	Q44	(B)
Q20	(A)	Q45	(C)
Q21	(C)	Q46	(B)
Q22	(A)	Q47	(A)
Q23	(A)	Q48	(B)
Q24	(B)	Q49	(C)
Q25	(B)	Q50	(B)

Hints & Solutions

Q1 Text Solution:

The following pattern exists in the given series:

First Term + 20 = 22 + 20 = 42

Second Term + 22 = 42 + 22 = 64

Third Term + 24 = 64 + 24 = 88

Fourth Term + 26 = 88 + 26 = 114

Hence, the correct option is (D) i.e., 114.

Q2 Text Solution:

Given equation, $x^2 - 8x + m = 0$

We know that, if α and β are the roots of the quadratic equation $ax^2 + bx + c = 0$, then

Sum of roots $= \alpha + \beta = -\frac{b}{a}$

Product of roots $= \alpha\beta = \frac{c}{a}$

Now, compare the given equation with $ax^2 + bx + c = 0$, we get

$a = 1,\ b = -8\ \ and\ c = m$

According to the question,

If α be the root of the equation $x^2 - 8x + m = 0$, then the other root will be $\alpha + 4$.

$\Rightarrow \alpha + \alpha + 4 = -(-8)$

$\Rightarrow 2\alpha + 4 = 8$

$\Rightarrow 2\alpha = 4$

$\Rightarrow \alpha = 2$

Also, for product of roots

$\Rightarrow \alpha(\alpha + 4) = m$

$\Rightarrow m = 2(2 + 4)$

$\Rightarrow m = 12$

Therefore, the value of m is 12.

Hence, the correct option is (D).

Q3 Text Solution:

Given: NEWYORK is written as 111

We know that,

Alphabets	A	B	C	D	E	F	G	H	I	J	K	L	M
Positional value	1	2	3	4	5	6	7	8	9	10	11	12	13
Positional value	26	25	24	23	22	21	20	19	18	17	16	15	14
Alphabets	Z	Y	X	W	V	U	T	S	R	Q	P	O	N

Here, NEWYORK = 14 + 5 + 23 + 25 + 15 + 18 + 11 = 111

Similarly, for NEWZEALAND

14 + 5 + 23 + 26 + 5 + 1 + 12 + 1 + 14 + 4 = 105

Therefore, NEWZEALAND is written as 105 in the same code.

Hence, the correct option is (D) i.e., 105.

Q4 Text Solution:

Given; $x^2 - 2(5 + m) + 3(7 + m) = 0$

Here,

$a = 1,\ b = -2(5 + m)\ \&\ c = 3(7 + m)$

Since, the roots are reciprocal of each other, then the roots of the equation are $\alpha\ \&\frac{1}{\alpha}$.

We know that,

$\alpha \times \frac{1}{\alpha} = \frac{c}{a}$

$\Rightarrow 1 = \frac{3(7+m)}{1}$

$\Rightarrow 1 = 21 + 3m$

$\Rightarrow 3m = -20$

$\Rightarrow m = -\frac{20}{3}$

Q5 Text Solution:

According to the given information, we get the alphabets are codes as shown in below table;

Alphabet	P	L	A	Y	R	H	Y	M	E
Number	8	1	2	3	4	9	3	6	7

As per the above table, MALE is coded as 6217

Hence, the correct option is (B) i.e., 6127.

Q6 Text Solution:

Given equation, $4x^2 - 6x + p = 0$

Let the roots of the equation is $\alpha\ \&\ \beta$, then

$\frac{\alpha}{\beta} = \frac{1}{2}$

$\Rightarrow 2\alpha = \beta$

Now, sum of roots $= \alpha + \beta = -\frac{b}{a}$

$\Rightarrow \alpha + 2\alpha = \frac{-(-6)}{4}$

$\Rightarrow 3\alpha = \frac{3}{2}$

$\Rightarrow \alpha = \frac{1}{2}$

$\Rightarrow \beta = 2\alpha = 2 \times \frac{1}{2} = 1$

Now, Product of roots $= \alpha\beta$

$\Rightarrow \alpha\beta = \frac{c}{a}$

$\Rightarrow \frac{1}{2} \times 1 = \frac{p}{4}$

$\Rightarrow p = 2$

Q7 Text Solution:

Given: P 3 C; R 5 F; T 8 I; V 12 L; _____ ?

A	B	C	D	E	F	G	H	I	J
1	2	3	4	5	6	7	8	9	10

K	L	M	N	O	P	Q	R	S	T
11	12	13	14	15	16	17	18	19	20

U	V	W	X	Y	Z
21	22	23	24	25	26

Using the positional value of each letter as mentioned above, we get

P	$+2 = R$	$+2 = T$	$+2 = V$	$+2 = X$
3	$+2 = 5$	$+3 = 8$	$+4 = 12$	$+5 = 17$
C	$+3 = F$	$+3 = I$	$+3 = L$	$+3 = O$

Therefore, the missing term is X17O.

Hence the correct option is (C) i.e X17O.

Q8 Text Solution:

Let the cost price of 1 pen be ₹x and of bag be ₹y.

According to the question,

$3x + 4y = 324$ & $4x + 3y = 257$

On adding the equations, we get

$7x + 7y = 581$

$\Rightarrow x + y = 83 \ \ldots.(i)$

On subtracting, we get

$-x + y = 67 \ldots (ii)$

From (i) and (ii), we have

$2y = 150$

$\Rightarrow y = 75$

Therefore, the price of 1 bag is ₹75.

Q9 Text Solution:

Compare the given quadratic equation $x^2 + x + 5 = 0$ with the general quadratic equation i.e., $ax^2 + bx + c = 0$ whose roots are $\alpha,\ \beta$.

we get, $a = 1,\ b = 1,\ c = 5$

As we know,

Sum of roots $= \frac{-b}{a}$

$\Rightarrow \alpha + \beta = -1$

Product of roots $= \frac{c}{a}$

$\Rightarrow \alpha\beta = 5$

Now, $\frac{\alpha^2}{\beta} + \frac{\beta^2}{\alpha} = \frac{\alpha^3+\beta^3}{\alpha\beta}$

$\Rightarrow \frac{\alpha^2}{\beta} + \frac{\beta^2}{\alpha} = \frac{(\alpha+\beta)^3 - 3\alpha\beta(\alpha+\beta)}{\alpha\beta}$

$\Rightarrow \frac{\alpha^2}{\beta} + \frac{\beta^2}{\alpha} = \frac{(-1)^3 - 3(5)(-1)}{(5)}$

$\Rightarrow \frac{\alpha^2}{\beta} + \frac{\beta^2}{\alpha} = \frac{-1+15}{5}$

$\Rightarrow \frac{\alpha^2}{\beta} + \frac{\beta^2}{\alpha} = \frac{14}{5}$

Thus, the required value of $\frac{\alpha^2}{\beta} + \frac{\beta^2}{\alpha}$ is $\frac{14}{5}$.

Q10 Text Solution:

Given: '253' means 'books are old' and '546' means 'man is old'

i.e., '5' is coded for 'old'

Also, '253' means 'books are old' and '378' means 'buy good books'

i.e., '3' is coded for 'books'

Now, '253' means 'books are old' i.e., 2 is coded for 'are'

Therefore, '2' stands for 'are' in that code.

Q11 Text Solution:

Given, $x^2 + x + r = 0$

Thus, Sum of roots $= \alpha + \beta = -1$

Product of roots $= \alpha\beta = r$

Also,

$\alpha^3 + \beta^3 = -6$

$\Rightarrow (\alpha + \beta)^3 - 3\alpha\beta\left(\alpha + \beta\right) = -6$

$\Rightarrow (-1)^3 - 3r\left(-1\right) = -6$

$\Rightarrow (-1) + 3r = -6$

$\Rightarrow 3r = -5$

$\Rightarrow r = -\frac{5}{3}$

Q12 Text Solution:

Given: TAP is coded as SZO

i.e.,

T	A	P
-1	-1	-1

S Z O

Similarly, FRIEND will be coded as EQHDMC.

Hence, the correct option is (B) i.e., EQHDMC

Q13 Text Solution:

Given, $a^2 + b^2 = 45$ and $ab = 18$

We know that,

$(a+b)^2 = a^2 + b^2 + 2ab$

$\Rightarrow (a+b)^2 = 45 + 2\left(18\right)$

$\Rightarrow (a+b)^2 = 81$

$\Rightarrow (a+b) = \pm 9$

Thus, $\frac{1}{a} + \frac{1}{b}$

$= \frac{b+a}{ab}$

$= \pm\frac{9}{18}$

$= \pm\frac{1}{2}$

Q14 Text Solution:

Let the cost of table be ₹x and cost of chair be ₹y, then

4x + 3y = 2250 ...(i)

3x + 4y = 1950 ...(ii)

Multiplying eq (i) with 3 and eq (ii) with 4 and then subtracting, we get

12x + 9y - (12x + 16y) = 6750 - 7800

- 7y = - 1050

y = 150

Thus, x = 450

Therefore, the cost of 2 chairs and 1 table = 2y + x = 2(150) + 450 = ₹750.

Q15 Text Solution:

We have, $2^{x+y} = 2^{2x-y} = \sqrt{8}$

$\Rightarrow 2^{x+y} = 2^{2x-y} = \left(2^3\right)^{\frac{1}{2}}$

$\Rightarrow 2^{x+y} = 2^{2x-y} = 2^{\frac{3}{2}}$

$\Rightarrow x + y = \frac{3}{2} \& \; 2x - y = \frac{3}{2}$

On adding both the equations, we get

$\left(x+y\right) + \left(2x-y\right) = \frac{3}{2} + \frac{3}{2}$

$\Rightarrow 3x = 3$

$\Rightarrow x = 1$

$\Rightarrow y = \frac{3}{2} - x = \frac{3}{2} - 1 = \frac{1}{2}$

Therefore, the values of x and y are $1 \; and \; \frac{1}{2}$ respectively.

Q16 Text Solution:

Given that,

The state name DELHI in code language written as EFMIJ.

Here, we can see each alphabet is replaced by the next letter i.e,

$A - B,\; B - C,\; C - D \ldots\ldots\ldots$

Thus, JAIPUR in code language can be written as KBJQVS.

Q17 Text Solution:

Compare the given quadratic equation $x^2 - 2kx + 16 = 0$ with the general quadratic equation i.e., $ax^2 + bx + c = 0$

We get, $a = 1,\; b = -2k,\; c = 16$

Let the equal roots be $\alpha,\; \alpha$

As we know,

Sum of roots $= \frac{-b}{a}$

$\Rightarrow \alpha + \alpha = 2k$

$\Rightarrow \alpha = k \quad ---(1)$

And product of roots $= \frac{c}{a}$

$\Rightarrow \alpha^2 = 16$

$\Rightarrow \alpha = \pm 4$ or $k = \pm 4$ (from equation 1)

Thus, the value of k is ± 4.

Q18 Text Solution:

On observing the pattern, we get

$2^2 = 4,$

$4^2 = 16,$

$(16)^2 = 256,$

$(23)^2 = 529$

All the numbers except 573 are perfect squares.

Hence, the correct answer is option (C) i.e. 573.

Q19 Text Solution:

Given: HEALTH is coded as IFBMUI.

We have to find the code for NORTH.

Table for HEALTH:

H	E	A	L	T	H
I	F	B	M	U	I

With the help of this table we can observe the next letter is assigned as the code of that letter.

Therefore, table for North is:

N	O	R	T	H
O	P	S	U	I

Then the code for NORTH is OPSUI.

Hence, the correct option is (A) i.e. OPSUI.

Q20 Text Solution:

On observing the pattern, we see that

$3 \times 2 = 6,$

$3 \times 3 = 9,$

$3 \times 5 = 15,$

$3 \times 7 = 21,$

$3 \times 8 = 24,$

$3 \times 10 = 30$

All the numbers except 28 are the multiples of 3.

Hence, the correct answer is option (A) i.e. 28.

Q21 Text Solution:

Given equation, $5z^2 + 13z + y = 0$

Let one root of the equation be α, then the other root will be $\frac{1}{\alpha}$.

Comparing the given equation with standard equation $az^2 + bz + c = 0$, we get

$a = 5,\ b\ = 13\ and\ c\ = y$

Now, product of roots $= \frac{c}{a}$

$\Rightarrow \alpha\ .\ \frac{1}{\alpha} = \frac{y}{5}$

$\Rightarrow 1 = \frac{y}{5}$

$\Rightarrow y = 5$

Q22 Text Solution:

Detailed Solution:

Given: $4^x \cdot 8^y = 128$

$\Rightarrow \left(2^2\right)^x \cdot \left(2^3\right)^y = 128$

$\Rightarrow \left(2^{2x}\right) \cdot \left(2^{3y}\right) = 2^7$

$\Rightarrow \left(2^{2x+3y}\right) = 2^7$

Thus, $2x + 3y = 7$

$\Rightarrow \frac{3^x}{27^y} = \frac{1}{3}$

$\Rightarrow \frac{3^x}{(3^3)^y} = \frac{1}{3}$

$\Rightarrow \frac{3^x}{(3^{3y})} = \frac{1}{3}$

$\Rightarrow 3^{x-3y} = 3^{-1}$

Therefore, $x - 3y = -1$

Multiplying eq (ii) by 2 , we get

$2(x - 3y) = 2(-1)$

$\Rightarrow 2x - 6y = -2$

Subtracting eq (iii) from eq (i), we get

$2x + 3y - (2x - 6y) = 7 - (-2)$

$\Rightarrow 2x + 3y - 2x + 6y = 7 + 2$

$\Rightarrow 9y = 9$

$\Rightarrow y = 1$

Substituting y = 1 in eq (ii), we get

$x - 3y = \ -1$

$\Rightarrow x - 3(1) = \ -1$

$\Rightarrow \ x = \ -1 + 3 = 2$

$\Rightarrow x = 2$

"Or" **GBC**:

For option (A): 2, 1

For eq (i):

$LHS = 4^x \cdot 8^y$

$= 4^2 \cdot 8^1$

$= 16 \times 8$

$= 128 = RHS$

For eq (ii):

$LHS = \frac{3^x}{27^y}$

$= \frac{3^2}{27^1} = \frac{9}{27}$

$= \frac{1}{3} = RHS$

Therefore, both the equations are satisfied.

Hence, the correct option is (A) i.e., 2,1.

Q23 Text Solution:

Let the shortest piece be of x cm.

According to the question,

Second length = 'x + 3' cm and Third length = '2x' cm

Thus,

$x + x + 3 + 2x = 91$

$\Rightarrow 4x = 91 - 3$

$\Rightarrow 4x = 88$

$\Rightarrow x = 22$

Therefore, the length of shortest piece of board is 22 cm.

Q24 Text Solution:

Given sequence: $5.2,\ 4.8,\ 4.4,\ 4,\ .....$

On observing the pattern, we get

$5.2 - 0.4 = 4.8$

$4.8 - 0.4 = 4.4$

$4.4 - 0.4 = 4.0$

$4.0 - 0.4 = 3.6$

Thus, the missing number is 3.6.

Hence, the correct option is (B) i.e., 3.6.

Q25 Text Solution:

Given series:

$225,\ 196,\ 169,\ 144,\ 121,\ 100,\ 77,\ 64$

The terms of the series are in form

$15^2,\ 14^2,\ 13^2,\ 12^2,\ 11^2,\ 10^2,\ \ldots\ldots\ldots$

Here, the seventh term should be 9^2 i.e., 81 but we are given 77 which is wrong.

Thus, the wrong term in the series is 77.

Hence, option (B) is the correct i.e. 77.

Q26 Text Solution:

Given sequence:

$80,\ 10,\ 70,\ 15,\ 60,\ 20,\ 50\ldots.$

On observing it, we analyze that it consists of alternating addition and subtraction series.

In the first pattern, 10 is subtracted from each number to get the next term

i.e., $80-10=70$

$70-10=60$

$60-10=50$

In the second pattern, 5 is added to each number to get the next number i.e.,

$10+5=15$

$15+5=20$

Thus, the missing term $=20+5=25$

Hence, the correct option is (A) i.e., 25.

Q27 Text Solution:

Observing the pattern of series we get ,

$14\times 2-3=25$

$25\times 2-3=47$

$47\times 2-3=91$

$179\times 2-3=355$

Missing term would be: $91\times 2-3=179$

Hence, we get $14,\ 25,\ 47,\ 91,\ 179,\ 355$

Therefore, option (C) is correct.

Q28 Text Solution:

Given series: $6,\ 16,\ 44,\ 126,\ 370,\ ?$

On observing the series, we get

$6\ \times\ 3-2=16$

$16\ \times\ 3-4=44$

$44\ \times\ 3-6=126$

$126\ \times\ 3-8=370$

$370\ \times\ 3-10=1100$

Therefore, the missing term is 1100.

Hence, the correct option is (A) i.e., 1100.

Q29 Text Solution:

Given that,

In code language the words can be written as ;

R	I	P	P	L	E
6	1	3	3	8	2

and

L	I	F	E
8	1	9	2

Thus, the word RIFFLE in code language can be written as;

R	I	F	F	L	E
6	1	9	9	8	2

Hence, option (C) is the correct answer i.e., 619982.

Q30 Text Solution:

Let ' $x+y'$ be ' A ' and '$x-y'$ be ' B '

$\frac{3}{A}+\frac{2}{B}=-1\ \ldots.(i)$

$\frac{1}{A}-\frac{1}{B}=\frac{4}{3}\ \ldots.(ii)$

Multiplying eq. (ii) by 3 ,

$\Rightarrow 3\times\left(\frac{1}{A}-\frac{1}{B}\right)=3\times\frac{4}{3}$

$\Rightarrow \frac{3}{A}-\frac{3}{B}=\frac{4}{1}\quad \ldots.(iii)$

Subtracting eq. (iii) from eq. (i),

$\Rightarrow \frac{3}{A}+\frac{2}{B}-\left(\frac{3}{A}-\frac{3}{B}\right)=-1-4$

$\Rightarrow \frac{3}{A}+\frac{2}{B}-\frac{3}{A}+\frac{3}{B}=-5$

$\Rightarrow \frac{5}{B}=-5$

$\Rightarrow B=-1$

Substituting B = -1 in eq. (ii), we get

$\frac{1}{A}-\frac{1}{B}=\frac{4}{3}$

$\Rightarrow \frac{1}{A}-\frac{1}{-1}=\frac{4}{3}$

$\Rightarrow \frac{1}{A}=\frac{4}{3}-1$

$\Rightarrow \frac{1}{A}=\frac{1}{3}$

$\Rightarrow A=3$

Thus,

$x+y=A=3\quad \ldots.(iv)$

$x-y=B=-1\ \ldots..(v)$

Adding eq. (iv) and eq. (v)

$\Rightarrow x+y+x-y=3-1$

$\Rightarrow 2x=2$

$\Rightarrow x=1$

Substituting x = 1 in eq. (iv)

$\Rightarrow x+y=3$

$\Rightarrow 1+y=3$

$\Rightarrow y=2$

Trick: Go by options

For option (B) i.e. x = 1 and y = 2

LHS: $\frac{3}{x+y}+\frac{2}{x-y}=\frac{3}{1+2}+\frac{2}{1-2}$

$=\frac{3}{3}+\frac{2}{-1}=1-2=-1=\text{RHS}$

Also, LHS: $\frac{1}{x+y}-\frac{1}{x-y}=\frac{1}{1+2}-\frac{1}{1-2}$

$=\frac{1}{3}-\frac{1}{-1}=\frac{1}{3}+1=\frac{4}{3}=\text{RHS}$

Thus the values are x = 1 and y = 2.

Hence the correct option is (B) i.e 1, 2.

Q31 Text Solution:

Let the present age of A be x years.

Thus, A's age 6 years ago = 'x - 6' years

According to the question,

$2x-3(x-6)=x$

$\Rightarrow 2x-3x+18=x$

$\Rightarrow -x+18=x$

$\Rightarrow 2x=18$

$\Rightarrow x=9$

Therefore, the present age of A is 9 years.

Q32 Text Solution:

Given: $x^3+x^2-x-1=0$

$\Rightarrow x^2(x+1)-(x+1)=0$

$\Rightarrow (x+1)(x^2-1)=0$

$\Rightarrow (x+1)(x^2-1^2)=0$

$\Rightarrow (x+1)(x+1)(x-1)=0$

$(\because a^2-b^2=(a+b)(a-b))$

$\Rightarrow (x+1)^2(x-1)=0$

$\Rightarrow x=-1,-1,1$

Thus, the roots of the given cubic equation are $-1,-1,\ 1.$

Q33 Text Solution:

Given, the roots of

$(k-4)x^2-2kx+(k+5)=0$ are coincident i.e., the root are equal.

Thus, if the roots are equal then $b^2-4ac=0$

Here, $a=k-4,\ b=-2k\ and\ c=k+5$

$\Rightarrow (-2k)^2-4(k-4)(k+5)=0$

$\Rightarrow 4k^2-4(k^2+5k-4k-20)=0$

$\Rightarrow 4k^2-4k^2-20k+16k+80=0$

$\Rightarrow -4k+80=0$

$\Rightarrow k=20$

Q34 Text Solution:

Given: $36,\ 20,\ 12,\ 8,\ 6,\ 4$

On observing the pattern, we have

$36-16=20$

$20-8=12$

$12-4=8$

$8-2=6$

$6-1=5\neq 4$

Therefore, 4 is odd out of the following numbers given.

Hence, the correct option is (B) i.e., 4.

Q35 Text Solution:

Let, the roots of the quadratic equation $x^2-kx+8=0$ be $\alpha,\ \beta.$

According to the question, $\alpha-\beta=4$

Compare the given quadratic equation $x^2-kx+8=0$ with the general quadratic equation i.e., $ax^2+bx+c=0$

we get, $a=1,\ b=-k,\ c=8$

As we know,

Sum of roots $=\frac{-b}{a}$

$\Rightarrow \alpha+\beta=k\ \ \ldots..\ (i)$

And product of roots $=\frac{c}{a}$

$\Rightarrow \alpha\beta=8$

Now, using the formula

$(\alpha-\beta)^2=(\alpha+\beta)^2-4\alpha\beta$

$\Rightarrow 16=k^2-32\ (\text{from equation i})$

$\Rightarrow k^2=48=\pm 4\sqrt{3}$

Thus, the value of k is $\pm 4\sqrt{3}$.

Q36 Text Solution:

The following pattern exists in the given series:

$12^0 = 1$

$12^1 = 12$

$12^2 = 144$

$12^3 = 1728$

$12^4 = 20736$

Hence, the correct answer is option (C) i.e., 20736.

Q37 Text Solution:

Given: 10, 100, 200, 310, 430, ?

The pattern follows here is:

10 + 90 = 100

100 + 100 = 200

200 + 110 = 310

310 + 120 = 430

Thus, the next term will be:

430 + 130 = 560

Hence, the correct option is (A) i.e., 560.

Q38 Text Solution:

Let the numbers be x and '8 - x'.

Then, according to the question, we have

$x^2 + (8 - x)^2 = 34$

$\Rightarrow x^2 + 64 + x^2 - 16x = 34$

$\Rightarrow 2x^2 - 16x + 30 = 0$

$\Rightarrow x^2 - 8x + 15 = 0$

$\Rightarrow x^2 - 3x - 5x + 15 = 0$

$\Rightarrow x\left(x - 3\right) - 5\left(x - 3\right) = 0$

$\Rightarrow \left(x - 3\right)\left(x - 5\right) = 0$

$\Rightarrow x = 3,\ x = 5$

Q39 Text Solution:

According to the question,

C	L	O	C	K
3	4	2	3	5

And

T	I	M	E
8	6	7	9

If we see the numbering of each alphabet then the code word of MOTEL will be

M	O	T	E	L
7	2	8	9	4

Hence, option (C) is the correct answer i.e., 72894.

Q40 Text Solution:

The standard form of quadratic equation is $ax^2 + bx + c = 0$ where sum of the roots is -b/a and sum of roots is c/a

As per the question :

Sum of the roots = 7

i.e, -b/a = 7

Also, product of the roots = 12

i.e, c/a = 12

From (i) & (ii), we can conclude that

a = 1 , b = -7 & c = 12

'Or'

We know that,

Quadratic equation can be written as:

$x^2 - \left(Sum\ of\ roots\right)x + Product\ of\ roots = 0$

Since, sum of roots is 7 and product of roots is 12

$\Rightarrow$Quadratic equation: $x^2 - 7x + 12 = 0$

Therefore the equation will be

$x^2 - 7x + 12 = 0$

Hence, the correct option is (C).

Q41 Text Solution:

Let A's present age = x years

6 years ago, A's age was 'x - 6' years

According to the question,

$2x - 3(x - 6) = x$

$\Rightarrow 2x - 3x + 18 = x$

$\Rightarrow -x + 18 = x$

$\Rightarrow 2x = 18$

$\Rightarrow x = 9$

Therefore, the present age of A = 9 years.

Hence, the correct option is (C).

Q42 Text Solution:

Observing the pattern, we get

$14 \times 1 - 8 = 6$

$6 \times 2 - 8 = 4$

$4 \times 3 - 8 = 4$

$4 \times 4 - 8 = 8$

Missing term is : $8 \times 5 - 8 = 32$

Hence, option (A) is correct.

Q43 Text Solution:

We have,

Word CLOCK is coded as 34235

C L O C K

3 4 2 3 5

Word TIME is coded as 8679

T I M E

8 6 7 9

Therefore, the word MOTEL can be coded as 72894.

Hence, the correct option is (A) i.e., 72894.

Q44 Text Solution:

Compare the given quadratic equation $4x^2 - 12x + k = 0$ with the general quadratic equation i.e., $ax^2 + bx + c = 0$, we get

$a = 4,\ b = -12,\ c = k$

Let the equal roots be $\alpha,\ \alpha$

As we know,

Sum of roots $= \frac{-b}{a}$

$\Rightarrow \alpha + \alpha = 3$

$\Rightarrow \alpha = \frac{3}{2}$ ------(1)

And product of roots $= \frac{c}{a}$

$\Rightarrow \alpha^2 = \frac{k}{4}$

$\Rightarrow \frac{9}{4} = \frac{k}{4}$

$\Rightarrow k = 9$

Thus, the value of k is 9 .

Q45 Text Solution:

Given: Quadratic Equation is

$x^2 + 7x + 12 = 0$

α and β are the roots of the equation,

$\Rightarrow x^2 + 4x + 3x + 12 = 0$

$\Rightarrow x(x + 4) + 3(x + 4) = 0$

$\Rightarrow (x + 3)(x + 4) = 0$

We get two roots, one will be α and the other will be β, equate them with 0,

$\Rightarrow x + 3 = 0$

$\Rightarrow x = \alpha\ (let) = -3$

$\Rightarrow x + 4 = 0$

$\Rightarrow x = \beta\ (let) = -4$

$\Rightarrow \alpha = -3,\ \beta = -4$

To find $\left(\frac{\alpha^2}{\beta} + \frac{\beta^2}{\alpha}\right)$

Substitute the values of α and β in the above equation,

$\Rightarrow \left(\frac{(-3)^2}{-4} + \frac{(-4)^2}{-3}\right)$

$\Rightarrow \left(\frac{9}{-4} + \frac{16}{-3}\right)$

$\Rightarrow \left(\frac{9(-3) + 16(-4)}{12}\right)$

$\Rightarrow \left(\frac{-27 - 64}{12}\right)$

$\Rightarrow \frac{-91}{12}$

Q46 Text Solution:

Given sequence: $7,\ 10,\ 14,\ 19,\ 25,\ ?$

The sequence follows a pattern:

i.e.,

$7 + 3 = 10$

$10 + 4 = 14$

$14 + 5 = 19$

$19 + 6 = 25$

Thus, the missing number is $25 + 7 = 32$

Hence, the correct option is (B) i.e., 32.

Q47 Text Solution:

In each number except 751, the difference between the first and third digit is the middle one.

Hence, the correct option is (A) i.e., 751.

Q48 Text Solution:

We know that,

If $x = \alpha$ is a solution of the $ax^2 + bx + c = 0$, then $x = \alpha$ will satisfy the equation.

Since, $x = m$ is the solution of the equation

$2x^2 + 5x - m = 0$

$\Rightarrow 2m^2 + 5m - m = 0$

$\Rightarrow 2m^2 + 4m = 0$

$\Rightarrow 2m(m + 2) = 0$

$\Rightarrow 2m = 0,\ m + 2 = 0$

$\Rightarrow m = 0,\ m = -2$

So, the values of m are 0 and -2 .

Hence, the correct option is (B).

Q49 Text Solution:

Given quadratic equation, $3x^2 - 14x + 8 = 0$

$\Rightarrow 3x^2 - 12x - 2x + 8 = 0$
$\Rightarrow 3x(x - 4) - 2(x - 4) = 0$
$\Rightarrow (x - 4)(3x - 2) = 0$
$\Rightarrow x - 4 = 0 \; or \; 3x - 2 = 0$
$\Rightarrow x = 4 \; or \; x = \frac{2}{3}$

Therefore, the roots are 4 and $\frac{2}{3}$.
Hence, option (C) is correct.

Q50 **Text Solution:**
Given equation: $x^3 - 6x^2 + 5x + 12 = 0$
We know that, for cubic equation
$ax^3 + bx^2 + c + d = 0$
Sum of roots $= -\frac{b}{a}$
Thus, for $x^3 - 6x^2 + 5x + 12 = 0$
Sum of roots $= -\frac{b}{a} = -\frac{-6}{1} = 6$
For option (A): $1, \; 3, \; 4$
Sum of roots $= 1 + 3 + 4 = 7$ which is not true
For option (B): $-1, \; 3, \; 4$
Sum of roots $= -1 + 3 + 4 = 6$ which is true
Also, for other options, it does not hold.
Therefore, $x = -1, \; 3, \; 4$
Hence, the correct option is (B) i.e., $-1, \; 3, \; 4$.