CAT 2019 Question Paper with Solution
Slot 2 QA

1. The real root of the equation $2^{6x} + 2^{3x+2} - 21 = 0$ is

A. $log_2 3$

B. $\log_2 9$

C. $log_3 27$

D. $\log_2 27$

Answer: A

Solution:

The given equation is $2^{6x} + 2^{3x+2} - 21 = 0$

$\left(2^{3x}\right)^2 + 2^2 \times (2^{3x}) - 21 = 0$

Taking $\left(2^{3x}\right) = a$, we get

The equation as $a^2 + 4a - 21 = 0$

$(a + 7)(a - 3) = 0$
$a = (-7)$ or 3
$2^{3x} = (-7)$ or 3
Negative value is impossible,
$2^{3x} = 3$
$3x = \log_2 3$
Hence, option (A) is the correct answer.

###TOPIC###Quantitative Aptitude||Algebra||Quadratic Equations###

2. The average of 30 integers is 5. Among these 30 integers, there are exactly 20 which do not exceed 5. What is the highest possible value of the average of these 20 integers?

A. 4

B. 5

C. 4.5

D. 3.5

Answer: C

Solution:

As 20 values do not exceed 5. All of them can be 5.

As all 30 values have a mean 5, if all 20 in the first group are equal to 5 then all the remaining 10 should also be equal to 5, which will violate the condition given in the question that "exactly 20 do not exceed 5".

It is also given that all the values are integers. Hence, if none of the second group of 10 integers is equal to 5 then all of them can be 6.

Since we need the maximum average of the group of 20, we must have the minimum average of the group of 10, that is why we have increased them the minimum possible.

So, the sum of those 10 is 60.

Since all 30 values have an average of 5, the sum of all 30 is 150.

So, the remaining 20 of the first group must have a sum of 150 – 60 = 90

So, the average = 90/20 = 4.5

Hence, option (C) is the correct answer.

###TOPIC###Quantitative Aptitude||Arithmetic||Averages###

3. Let a, b, x, y be real numbers such that $a^2 + b^2 = 25$, $x^2 + y^2 = 169$ and ax + by = 65. If k = ay - bx, then

A. k = 0
B. k > 513513
C. k = 513513
D. 0 < k ≤ 513

Answer: A

Solution:

$a^2 + b^2 = 25$……………….(1)

$x^2 + y^2 = 169$……………….(2)

ax + by = 65………………..(3)

(1) x (2) or $a^2x^2+b^2y^2+a^2y^2+b^2x^2=25x169 = 4225$……….(4)

(3) squared or $a^2x^2+2abxy+b^2y^2=4225$……………………..(5)

(4) – (5) or $a^2y^2 - 2abxy + b^2x^2 = 0$

$(ay - bx)^2 = 0$

ay – bx = 0 = k

Hence, option (A) is the correct answer.

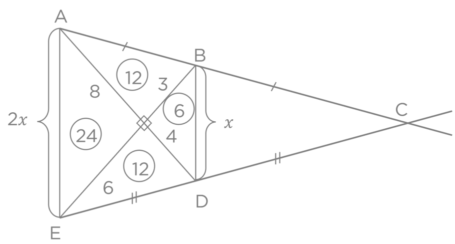
###TOPIC###Quantitative Aptitude||Number System||Indices and Surds###

4. In a triangle ABC, medians AD and BE are perpendicular to each other, and have lengths 12 cm and 9 cm, respectively. Then, the area of triangle ABC, in sq. cm, is

A. 80
B. 68
C. 72
D. 78

Answer: C

Solution:



In the above diagram,

AD and BE are perpendicular to each other.

AD = 12 cm and BE = 9 cm. They intersect at the centroid G.

So, AG:GD= BG:GE= 2:1

So, AG = 8 cm, GD = 4 cm, BG = 6 cm and GE = 3 cm.

In the right angled triangle AGE,

Area = ½ x base x height = ½ x AG x GE = ½ x 8 x 3 = 12 cm^2

Similarly, we can find the other areas as shown in the diagram as,

AGB = 24 cm^2

BGD = 12 cm^2

And DGE = 6 cm^2

So, the area of the trapezium BDEA = 54 cm^2, which is ¾ th of the triangle ABC.

So, the area of the triangle ABC is 54 x 4/3 cm^2 = 72 cm^2

Hence, option (C) is the correct answer.

###TOPIC###Quantitative Aptitude||Geometry||Lines, Angles, Triangles###

5. Let a_1 , a_2 be integers such that $a_1 - a_2 + a_3 - a_4 + \ldots\ldots + (-1)^{n-1} a_n = n$, for $n \geq 1$. Then $a_{51} + a_{52} + \ldots\ldots + a_{1023}$ equals

A. -1

B. 1

C. 0

D. 10

Answer: B

Solution:

Given, $a_1 - a_2 + a_3 - a_4 + \ldots\ldots + (-1)^{n-1} a_n = n$..............(1)

So, $a_1 - a_2 + a_3 - a_4 + \ldots\ldots + (-1)^{n-2} a_{n-1} = n - 1$ ....(2)

(1)– (2) gives us ,
$(-1)^{n-1} a_n = n - (n - 1) = 1$
$a_n = (-1)^{1-n}$
So, the series becomes 1, -1, 1, -1, ...
So, any odd-numbered term is 1 and any even-numbered term is (-1).
So, we will get,

$a_{51} + a_{52} + \ldots\ldots + a_{1023} = 1 - 1 + 1 - 1 + \ldots .\ 1 = 0 + 0 + \ldots 0 + 1 = 1$

Hence, option (B) is the correct answer.

###TOPIC###Quantitative Aptitude||Progression||Sequence & Series###

6. How many factors of 2^4 x 3^5 x 10^4 are perfect squares which are greater than 1?

Answer: 44

Solution:

To get a perfect square, the powers of each prime factor must be an even number or zero.

We have been given 2^4 x 3^5 x 10^4 = 2^4 x 3^5 x 2^4 x 5^4 =2^8 x 3^5 x 5^4

So, the powers of 2 can be zero or 2 or 4 or 6 or 8 that is, 5 ways.

Similarly, 3 can have powers of zero or 2 or 4, that is, 3 ways.

And 5 can also have powers of zero or 2 or 4, that is, 3 ways.

Total number of ways = 5 x 3 x 3= 45

But, out of these, there is a "1".

We have to exclude that.

So, the number of ways = 45 – 1 = 44

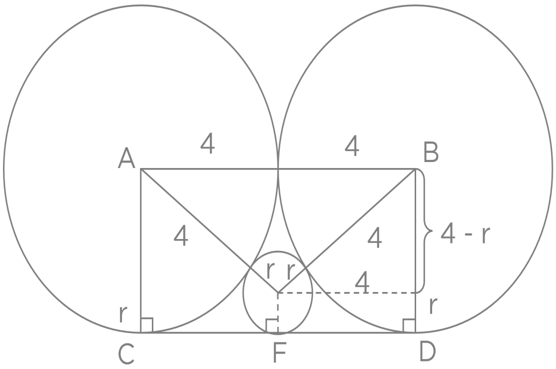
Hence, 44 is the correct answer.

###TOPIC###Quantitative Aptitude||Number System||Factors and their properties###

7. Two circles, each of radius 4 cm, touch externally. Each of these two circles is touched externally by a third circle. If these three circles have a common tangent, then the radius of the third circle, in cm, is

A. π/3
B. 1
C. $1/\sqrt{2}$
D. $\sqrt{2}$

Answer: B
Solution:



Let, the radius of the smaller third circle be r cm.
Since the radius and tangent are perpendicular to each other at the point of contact, EF is perpendicular to the common tangent CD.
Also, BD is perpendicular to the common tangent CD.
We drop a perpendicular from E on BD at G.
So, EG = FD= 4 and BG = (4-r)
So, in the right-angled triangle BEG, using Pythagoras' Theorem, we will get,
$4^2 + (4 - r)^2 = (4+r)^2$
16 = 16r
1 = r

Hence, option (B) is the correct answer.

###TOPIC###Quantitative Aptitude||Geometry||Circle###

8. What is the largest positive integer 'n' such that

$\frac{n^2+7n+12}{n^2-n-12}$ is also a positive integer?

A. 6
B. 8
C. 16
D. 12

Answer: D

Solution:

$$\frac{n^2+7n+12}{n^2-n-12} = \frac{(n+4)(n+3)}{(n-4)(n+3)} = \frac{n+4}{n-4}$$

Now we can check with the given options.

If we take the largest value option (C), n=16

$\frac{n+4}{n-4} = \frac{20}{12}$ which is not a fraction.

So, C cannot be our answer.

Let's consider, n=12, the value will be 2.
Hence, option (D) is the correct answer.

###TOPIC###Quantitative Aptitude||Algebra||Inequalities###

9. In 2010, a library contained a total of 11500 books in two categories - fiction and non-fiction. In 2015, the library contained a total of 12760 books in these two categories. During this period, there was a 10% increase in the fiction category while there was 12% increase in the non-fiction category. How many fiction books were in the library in 2015?

A. 6600
B. 6160
C. 6000
D. 5500

Answer: A

Solution:

Let, in the year 2010, in the library, the number of fiction books were 100F and the number of non-fiction books were 100N.

So, 100F+100N = 11500

F+N=115……………..(1)

In the year 2015, the books became 110F and 112N, respectively.

So, 110F+112N = 12760

55F+56N = 6380…………..(2)

We need to find the value of 110F.

From (1), we get, N = 115 – F ……………..(3)

Substituting this value in (2), we will get, 55F + 56(115 – F) = 6380

F = 60
110F = 6600

Hence, option (A) is the correct answer.

###TOPIC###Quantitative Aptitude||Algebra||Linear Equations###

10. Let f be a function such that f (mn) = f (m) f (n) for every positive integer m and n. If f (1), f (2) and f (3) are positive integers, f (1) < f (2), and f (24) = 54, then f (18) equals

Answer: 12
Solution:

f(2) = f(2 x 1) = f(2) x f(1) or f(1) = 1

F(24) = f(2^3 x 3) = f(2 x 2 x 2 x 3) = $\{f(2)\}^3$ x f(3) =54(given) = 3^3 x 2

Comparing, we get, f(2) = 3 and f(3) = 2

So, f(18) = f(3 x 3 x 2) = $\{f(3)\}^2$x f(2) = 2^2 x 3 = 12

Hence, 12 is the correct answer.

###TOPIC###Quantitative Aptitude||Functions and Graphs||Functions and Graphs###

11. Let A and B be two regular polygons having a and b sides, respectively.

If b = 2a and each interior angle of B is 3/2 times each interior angle of A,

then each interior angle, in degrees, of a regular polygon with a + b sides is

Answer: 150

Solution:

We can draw the following table:

Polygon	Number of sides	Each int. angle
A	a	$180 - \frac{360}{a}$
B	b=2a	$180 - \frac{180}{a}$
Third	a+b=3a	$180 - \frac{120}{a}$

Given, $180 - \frac{180}{a} = \frac{3}{2} \times \left(180 - \frac{360}{a}\right)$

Solving, we get, a = 4 or 3a = 12

Hence, 150 is the correct answer.

###TOPIC###Quantitative Aptitude||Geometry||Quadrilateral & Polygons###

12. A cyclist leaves A at 10 am and reaches B at 11 am. Starting from 10:01 am, every minute a motorcycle leaves A and moves towards B. Forty-five such motorcycles reach B by 11 am. All motorcycles have the same speed. If the cyclist had doubled his speed, how many motorcycles would have reached B by the time the cyclist reached B?

A. 22
B. 20
C. 15
D. 23

Answer: C

Solution:

Since 45 motorcyclists reach B by 11 am, we can infer that the last one to reach B was the motorcyclist who set out at 10:45 am.

So, he took 15 minutes to cover the distance from A to B.

Let us assume the speed of each motorcyclist to be M meters per minute.

So, the distance AB = 15M meters

Let us assume that the initial speed of the cyclist is C meters per minute.

So, the cyclist took 15M/C minutes to reach B, which is given to be 60.

So, 15M/C = 60

M = 4C
Distance AB = 60C = 15M

Now, if the speed is doubled, the speed of the cyclist becomes 2C meters per minute.

So, time taken to reach B = $\frac{60C}{2C} = 30$ minutes

Now, since a motorcyclist takes 15 minutes to reach B, the last motorcycle to reach B at 10:30 will be the one who left A at 10:15 am.

So, he will be the 15^{th} motorcyclist.

Hence, option (C) is the correct answer.

###TOPIC###Quantitative Aptitude||Arithmetic||Speed, Time and Distance###

13. Let A be a real number. Then the roots of the equation $x^2 - 4x - \log_2 A = 0$ are real and distinct if and only if

A. A < 1/16
B. A > 1/8
C. A > 1/16
D. A < 1/8

Answer: C

Solution:

Since the roots are real and distinct, discriminant ($b^2 - 4ac > 0$) will be greater than zero. So, $(-4)^2 + 4\log_2 A > 0$

$16 + 4\log_2 A > 0$
$4 > -\log_2 A$
$4 > \log_2 A^{-1}$
$16 > A^{-1}$
$A > 1/16$

Hence, option (C) is the correct answer.

###TOPIC###Quantitative Aptitude||Algebra||Logarithm###

14. John jogs on track A at 6 kmph and Mary jogs on track B at 7.5 kmph. The total length of tracks A and B is 325 metres. While John makes 9 rounds of track A, Mary makes 5 rounds of track B. In how many seconds will Mary make one round of track A?
Answer: 48
Solution:

We can form the following table,

Name	Speed (kmph)	Speed mps	Track in m	Time per round
John	6	5/3	J (let)	3J/5
Mary	7.5	25/12	M (let)	12M/25

So, 9 x (3J/5) = 5 x (12M/25)

9J/5=4M/5

9J = 4M = 36K (let) where k is a non zero constant

So, J = 4K and M = 9K

Name	Speed (kmph)	Speed mps	Track in m	Time per round
John	6	5/3	4K	12K/5
Mary	7.5	25/12	9K	108K/25

If Mary wants to cover track A, which is 4K long, she will take 48K/25 seconds.

It is given that 4K + 9K = 325 or K = 25

So, Mary will take 48k/25 = 48x25/25 = 48 seconds

Hence, 48 is the correct answer.

###TOPIC###Quantitative Aptitude||Arithmetic||Speed, Time and Distance###

15. Anil alone can do a job in 20 days while Sunil alone can do it in 40 days. Anil starts the job, and after 3 days, Sunil joins him. Again, after a few more days, Bimal joins them and they finish the job. If Bimal has done 10% of the job, then in how many days was the job done?

A. 13
B. 12
C. 15
D. 14

Answer: A

Solution:

LCM of 20 and 40 = 40

Let the total work be 40W.

As Anil completes the work in 20 days, he completes 2W in a day.

Similarly, Sunil completes 1W in a day.

Let the total work be done in D days.

Anil worked for all D days.

So, work done by him = 2DW

Sunil joined 3 days later.

So, he worked for (D – 3) days, so, he did (D – 3)W work

Now, Bimal did 10% of the job

So, he did 4W.

So, Anil's work + Sunil's work + Bimal's work = 2DW+(D – 3) W + 4W = 40W

2D + D – 3+ 4 = 40

3D = 39

D = 13

Hence, option (A) is the correct answer.

###TOPIC###Quantitative Aptitude||Arithmetic||Time and Work###

16. In an examination, Rama's score was one-twelfth of the sum of the scores of Mohan and Anjali. After a review, the score of each of them increased by 6. The revised scores of Anjali, Mohan, and Rama were in the ratio 11:10:3. Then Anjali's score exceeded Rama's score by

A. 26
B. 32
C. 24
D. 35

Answer: B

Solution:

Let, initially, Anjali, Mohan, and Rama scored A, M, and R respectively.

After review, their scores became (A+6), (M+6), and (R+6) respectively, which are in the ratio 11:10:3= 11k:10k:3k where k is a non-zero constant.

So, $A + 6 = 11k$ or $A = 11k - 6$

Similarly, we will get, $M = 10k - 6$ and $R = 3k - 6$

It is given that $R = (M+A)/12$

Substituting the values, we will get,

$3k - 6 = (21k - 12)/12$

Or, $36k - 72 = 21k - 12$ or $k = 4$

$A - R = 11k - 6 - (3k - 6) = 8k = 32$

Hence, option (B) is the correct answer.

###TOPIC###Quantitative Aptitude||Arithmetic||Ratio and Proportion###

17. In an examination, the score of A was 10% less than that of B, the score of B was 25% more than that of C, and the score of C was 20% less than that of D. If A scored 72, then the score of D was

Answer: 80

Solution:

A = 0.9 B
B = 1.25C
C = 0.8D
Since A = 72, 0.9 B = 72 or B = 80
1.25 C =80
C = 64
0.8 D = 64
D = 80

Hence, 80 is the correct answer.

###TOPIC###Quantitative Aptitude||Arithmetic||Percentages###

18. The base of a regular pyramid is a square and each of the other four sides is an equilateral triangle, the length of each side being 20 cm. The vertical height of the pyramid, in cm, is

A. $10\sqrt{2}$
B. $8\sqrt{3}$
C. 12
D. $5\sqrt{5}$

Answer: A

Solution:

The vertical height of the pyramid = H (let)

The slant edge of the pyramid = length of the side of equilateral triangles = 20 cm

For the square base, diagonal = $20\sqrt{2}cm$ and half of it = $10\sqrt{2}cm$

Now, half of the diagonal, H, and 20 will form a vertical right-angled triangle.

So, using Pythagoras' Theorem, we will get, $H^2+200= 400$ or H = $10\sqrt{2}cm$
Hence, option (A) is the correct answer.

###TOPIC###Quantitative Aptitude||Mensuration||Pyramid & Cone###

19. If x is a real number ,then $\sqrt{log_e\left(\frac{(4x-x^2)}{3}\right)}$ is a real number, if and only if,

A. -3 ≤ x ≤ 3
B. 1 ≤ x ≤ 2
C. 1 ≤ x ≤ 3
D. -1 ≤ x ≤ 3

Answer: C

Solution:

$\sqrt{log_e\left(\frac{(4x-x^2)}{3}\right)}$ will be real if the quantity inside the square root sign is non-negative.

If the quantity under the square root sign is zero, then $\frac{4x-x^2}{3} = 1$

$4x - x^2 - 3 = 0$
X= 3 or 1

Now, among the given options, A and D include zero.

But, if we put x = zero, then we can not find the logarithm.

Hence, options A and D cannot be the answers.

Option B does not contain x = 3, hence, that is also not the answer.

Hence, option (C) is the correct answer.

###TOPIC###Quantitative Aptitude||Algebra||Quadratic Equations###

20. Let ABC be a right-angled triangle with hypotenuse BC of length 20 cm. If AP is perpendicular on BC, then the maximum possible length of AP, in cm, is

A. 10
B. $8\sqrt{2}$
C. $6\sqrt{2}$
D. 5

Answer: A
Solution:

For any right-angled triangle, the median drawn from the right angular vertex onto the hypotenuse is half of the hypotenuse and for any isosceles triangle, median drawn on the unequal side is perpendicular to it.

So, in this case, AP will be maximum if P is the midpoint of BC.

So, AP max will be ½ x 20 = 10 cm

Hence, option (A) is the correct answer.

###TOPIC###Quantitative Aptitude||Geometry||Lines, Angles, Triangles###

21. Two ants A and B start from a point P on a circle at the same time, with A moving clockwise and B moving anti-clockwise. They meet for the first time at 10:00 am when A has covered 60% of the track. If A returns to P at 10:12 am, then B returns to P at

A. 10:27 am
B. 10:25 am
C. 10:45 am
D. 10:18 am

Answer: A

Solution:

Let the total track be 100T units long.

By the time A covered 60%, B covered the remaining 40%.

So, A covered 60T and B covered 40T.

Let, speed of A be a and that of B be b.

So, $\frac{60T}{a} = \frac{40T}{b}$

$\frac{b}{2} = \frac{a}{3}$=k (let), where k is a non-zero constant.

$b = 2k, a = 3k$
Now, A covered 40T in 12 minutes.
$\frac{40T}{3k} = 12$
$10T = 9k$
60T = 54k
To cover this distance, B will take 54k/2k minutes = 27 minutes
B will return to P at 10:27.

Hence, option (A) is the correct answer.

###TOPIC###Quantitative Aptitude||Arithmetic||Speed, Time and Distance###

22. How many pairs (m,n) of positive integers satisfy the equation $m^2 + 105 = n^2$?

Answer: 4

Solution:

The equation is $m^2 + 105 = n^2$?

Or, $105 = n^2 - m^2 = (n+m)(n-m)$

Since 105 is odd, both the (n+m) and (n-m) must be odd

Now, we can form the following table:

Case	N	m	n+m	n-m	(n+m)(n-m)	acceptable?
1	Odd	Odd	Even	Even	Even	No
2	Odd	Even	Odd	Odd	Odd	Yes
3	Even	Even	Even	Even	Even	No
4	Even	Odd	Odd	Odd	Odd	Yes

Now, 105 = 1 x 105 = 3 x 35 = 5 x 21 = 7 x 15

So, we can form the following table:

Case	n+m	n-m	m	N
1	105	1	53	52
2	35	3	19	16
3	21	5	13	8
4	15	7	11	4

So, there are 4 possible pairs.
Hence, 4 is the correct answer.

###TOPIC###Quantitative Aptitude||Number System||Properties of Numbers###

23. The salaries of Ramesh, Ganesh and Rajesh were in the ratio 6:5:7 in 2010, and in the ratio 3:4:3 in 2015. If Ramesh's salary increased by 25% during 2010-2015, then the percentage increase in Rajesh's salary during this period is closest to

A. 7
B. 8
C. 9
D. 10

Answer: A

Solution:

In 2010, the salaries of Ramesh, Ganesh, and Rajesh were 600k, 500k, and 700k respectively.

Now, we can form the following table:

Name	Salary 2010	Increase %	Increase Rs.	Salary 2015
Ramesh	600k	25	150k	750k
Ganesh	500k			
Rajesh	700k	R (let)	7Rk	7k(100+R)

It is given that 750k : {7k(100+R)} = 3:3= 1:1

Solving, we get, R = 50/7 = 7.142857=7 (approx.)

Hence, option (A) is the correct answer.

###TOPIC###Quantitative Aptitude||Arithmetic||Ratio and Proportion###

24. A man makes complete use of 405 cc of iron, 783 cc of aluminium, and 351 cc of copper to make a number of solid right circular cylinders of each type of metal. These cylinders have the same volume and each of these has a radius of 3 cm. If the total number of cylinders is to be kept at a minimum, then the total surface area of all these cylinders, in sq. cm, is

A. 1044(4 + π)
B. 8464π
C. 928π
D. 1026(1 + π)

Answer: D

Solution:

Let, for each cylinder, the height be h cm.

So, volume of each cylinder = $9\pi h$ cm^3

Since the number of cylinders is minimum, the volume of each cylinder will be maximum.

Now, HCF of (405, 783, 351) is 27

So, volume of each cylinder should be 27 cc and $9\pi h = 27$ or $h = \frac{3}{\pi}$

Total surface area of each cylinder = $2\pi r(r + h) = 6\pi\left(3 + \frac{3}{\pi}\right) = 18\pi + 18$

Total volume of metals available = (405+783+351) cc = 1539cc
Number of cylinders = 1539/27 = 57
Total surface area of all cylinders = 57 x $(18\pi + 18) = 1026(\pi + 1)$

###TOPIC###Quantitative Aptitude||Mensuration||Prism & Cylinder###

25. The quadratic equation $x^2 + bx + c = 0$ has two roots 4a and 3a, where a is an integer. Which of the following is a possible value of $b^2 + c$?

A. 3721
B. 549
C. 361
D. 427

Answer: B

Solution:

Sum of the roots = 7a
Product of the roots = $12a^2$
So, 7a= (-b) and $12a^2$ =c
Hence, $b^2 + c = 49a^2 + 12a^2 = 61 a^2$
Let's check with the options:

Option	Value	Value/61	Square root	Integer?
A	3721	61	7.8	No
B	549	9	3	Yes
C	361	5.9	Not an integer	No
D	427	7	Not an integer	No

Hence, option (B) is the correct answer.

###TOPIC###Quantitative Aptitude||Algebra||Quadratic Equations###

26. 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

Answer: 7

Solution:

Let, from left to write, the digits be a, b, c, d, e, and f.

So, f = a+b+c…………….(1)

e = a+b……………..(2)

a = c…………….(3)

2a=b……………….(4)

d = e+f……….(5)

Substituting the value of b from (4) to (2), we get, e = 3a………………(6)

Substituting the value of b from (4) to (1), we get, f = 3a+c……………(7)

Substituting the value of c from (3) to (7) we get, f = 4a…………….(8)

Combining (6) and (8), and substituting the values in (5), we get,

d = 7a……………(9)

Since a is an integer, and it is the leftmost digit of a six-digit number,

A can not be zero.

So, d = 7a can also not be zero.

If a = 1, then d = 7x1= 7

If a =2 then d = 7x2= 14>9 which is not possible

So, the only value of d is 7 and it is the maximum value.
Hence, 7 is the correct answer.

###TOPIC###Quantitative Aptitude||Number System||Properties of Numbers###

27. Mukesh purchased 10 bicycles in 2017, all at the same price. He sold six of these at a profit of 25% and the remaining four at a loss of 25%. If he made a total profit of Rs. 2000, then his purchase price of a bicycle, in Rupees, was

A. 2000
B. 6000
C. 8000
D. 4000

Answer: D

Solution:

Let, the CP of each bicycle be 100C.

So, we can form the following table:

Case	Number	Each cp	Each prof %	Each prof Rs	Each SP	Total SP
First	6	100C	25	25C	125C	750C
Second	4	100C	25	25C	75C	300C
Total	10	100C				1050C

Total CP = 1000C

Total SP = 1050C

So, total profit = 50C = 2000 (given) C = 40

100C = 4000

Hence, option (D) is the correct answer.

###TOPIC###Quantitative Aptitude||Arithmetic||Profit, Loss and Discount###

28. The number of common terms in the two sequences:

15, 19, 23, 27, ... , 415 and 14, 19, 24, 29, ... , 464 is

A. 20
B. 18
C. 21
D. 19

Answer: A

Solution:

Series	First term	Common diff	N th term
First	15	4	11+4n
Second	14	5	9+5n

Let, r^{th} term of the first series is equal to the s^{th} term of the second series

So, 11+4r=9+5s or 2+4r=5s

Substituting r = 2, we get, s = 2

Substituting r = 2+5= 7, we get, s = 2+4= 6

Substituting r = 7+5=12, we get s = 6+4 = 10 etc.

Now, for the first series, the last term is 415 = 11+4n or n = 101 or there are 101 terms in the first series.

The maximum value of r can be 101, on the other hand, we can similarly find that the number of terms in the second series = 91

So the maximum value of s can be 91.

Now, we can tabulate the pairs of values of r and s as

Case	Value of r	Value of s
1	2	2
2	7	6
3	12	10

Now, the values of r and s also form AP and mth value of r = 5m – 3 ≤ 101

and n th value of s = 4n – 2 ≤ 91. So, m ≤ 20.8 or max value of m = 20

and n≤ 23.5, max value of n = 23. So, the minimum value of 20 and 23 is 20.

So, there will be 20 values that are common between the given two series.

Hence, option (A) is the correct answer.

###TOPIC###Quantitative Aptitude||Progression||Sequence & Series###

29. If (2n+1) + (2n+3) + (2n+5) + ... + (2n+47) = 5280 , then what is the value of 1+2+3+ ... +n ?

Answer: 4851

Solution:

(2n+1) + (2n+3) + (2n+5) + ... + (2n+47) = 5280 has 24 terms,

So, 48n + 1+3+5+...+47 = 5280

48n + 576=5280
n = 98
1+2+3+....+98= 98(99)/2= 4851

Hence, 4851 is the correct answer.

###TOPIC###Quantitative Aptitude||Algebra||Linear Equations###

30. The strength of a salt solution is p% if 100ml of the solution contains p grams of salt. Each of three vessels A, B, C contains 500 ml of salt solution of strengths 10%, 22%, and 32%, respectively. Now, 100 ml of the solution in vessel A is transferred to vessel B. Then, 100 ml of the solution in vessel B is transferred to vessel C. Finally, 100 ml of the solution in vessel C is transferred to vessel A. The strength, in percentage, of the resulting solution in vessel A is

A. 15
B. 12
C. 13
D. 14

Answer: D

Solution:

Solution	Percent	In 100ml	In 500ml
A	10	10	50
B	22	22	110
C	32	32	160

At first, when 100 ml A was mixed with 500 ml B, the resultant mixture (let, D) had 600 ml with 120 g salt, that is, a 20% solution.

Now if 100 ml of D is mixed with C to get E (let) then E will have 600 ml with 160+20=180 g salt, that is, a 30% solution.

Now, this 100 ml of E is mixed with A to get F, say.

Now, 100 ml of E has 30g salt and A previously had a 400 ml solution with 10 % or 40 g.

So, now, F has 500 ml with 70 g salt, or 14%.

Hence, option (D) is the correct answer.

###TOPIC###Quantitative Aptitude||Arithmetic||Mixtures and Alligations###

31. If $5^x - 3^y = 13438$ and $5^{x-1} + 3^{y+1} = 9686$, then x+y equals

Answer: 13

Solution:

Let, $5^x = a$ and $3^y = b$

So, from the first equation, we get, a – b = 13438…………..(1)

And from the second equation we will get, a/5 +3b = 9686…. (2)

Solving, we get, a = 15625, b = 2187

So, $5^x = 15625 = 5^6$ or x= 6

And $3^y = 2187 = 3^7$ or y = 7

So, x + y= 6+7 = 13

Hence, 13 is the correct answer.

###TOPIC###Quantitative Aptitude||Number System||Indices and Surds###

32. Amal invests Rs 12000 at 8% interest, compounded annually, and Rs 10000 at 6% interest, compounded semi-annually, both investments being for one year. Bimal invests his money at 7.5% simple interest for one year. If Amal and Bimal get the same amount of interest, then the amount, in Rupees, invested by Bimal is

Answer: 20920

Solution:

Name	P	T (yrs.)	R	SI/CI	Compound	Int	Amt
Amal 1	12000	1	8	CI	Annually		
Amal 2	10000	1	6	CI	Semi annually		
Bimal	100B(let)	1	7.5	SI	NA	7.5B	

We can find the interest by Amal in the first case as 960 and second case as $10000\left(1+\frac{6}{2\times100}\right)^2-10000=609$

So, total interest of Amal = 1569 =7.5 B

So, B = 209.2 or 100B = 20920

Hence, 20920 is the correct answer.

###TOPIC###Quantitative Aptitude||Arithmetic||Interest (Simple and Compound)###

33. A shopkeeper sells two tables, each procured at cost price p, to Amal and Asim at a profit of 20% and at a loss of 20%, respectively. Amal sells his table to Bimal at a profit of 30%, while Asim sells his table to Barun at a loss of 30%. If the amounts paid by Bimal and Barun are x and y, respectively, then (x - y) / p equals

A. 1
B. 1.2
C. 0.7
D. 0.50

Answer: A

Solution:

CP for Amal = 1.2p

CP for Asim = 0.8p

CP for Bimal = 1.2p x 1.3= 1.56p = x (given)

CP for Barun = 0.8 x 0.7 p = 0.56p = y (given)

So, x − y = p

So, the answer is 1.

Hence, option (A) is the correct answer.

###TOPIC###Quantitative Aptitude||Arithmetic||Profit, Loss and Discount###

34. John gets Rs 57 per hour of regular work and Rs 114 per hour of overtime work. He works all together 172 hours and his income from overtime hours is 15% of his income from regular hours. Then, for how many hours did he work overtime?
Answer: 12

Solution:

We can form the following table:

Case	Hour	Rate per hour	Total
Normal	N	57	57N
Overtime	E	114	114E
Total	172	Not applicable	

So, N + E = 172…………..(1)

And 57N x 0.15 = 114E…………(2)

0.15 N = 2E……………..(3)
E = 0.0 75N…….(4)
Substituting for E in (1), weget, 1.075N = 172 or N= 160
E = 172- 160 = 12

Hence, 12 is the correct answer.

###TOPIC###Quantitative Aptitude||Arithmetic||Time and Work###