SSC CGL Tier-2 9-March-2018 Maths Shift-2

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Instructions
For the following questions answer them individually

Question 1

How many two digit prime numbers are there between 10 to 100 which remains prime numbers when the order of their digits is reversed?

A 8

B 9

C 10

D 12

Answer: B

Explanation:
9 such prime numbers are there in between 10 and 100.

Those are : 11,13,17,31,37,71,73,79 & 97.

B is correct choice.

Question 2

How many perfect cubes are there between 1 and 100000 which are divisible by 7?

A 5

B 6

C 7

D 15

Answer: B

Explanation:
A perfect cube that is divisible by 7 ,when that number contain a cube of 7 or a perfect

multiple of 7's cube in following form , $N = 7^3 \times k^3 \ (where,\ k = 1, 2, 3.....)$

If we, put k=6 ,then the number become, $N = 7^3 \times 6^3 = 74088.$

But , if we put k=7, then the number become, $N = 7^3 \times 7^3 = 117649.$

117649 exceeds 100000 , So there are only 6 numbers(when, k=1,2,....,6) present between 1 and 100000 which are divisible by 7.

B is correct choice.

Question 3

If $A = 0.142857142857$ and $B = 0.16666$ ....., then what is the value of $_{AB}^{(A+B)}$?

A 10

B 11

C 12

D 13

Answer: D

Explanation:

$A = 0.142857142857$

or, $1000000A = 142857 + 0.142857$

or, $1000000A = 142857 + A$

or, $A = {}^{142857}/_{999999}$

or, $A = {}^{1}/_{7}$.

Now,

$B = 0.16666.....$

or, $100B = 16 + 0.6666.....$

or, $100B = 16 + P\ (let\ say,\ P = 0.6666....)$

So, $10P = 6 + 0.66666.....$

or, $10P = 6 + P.$

or, $P = {}^{6}/_{9} = {}^{2}/_{3}$.

So, $100B = 16 + {}^{2}/_{3} = {}^{50}/_{3}$.

or, $B = {}^{1}/_{6}$.

So, $\binom{(A+B)}{AB} = \binom{\frac{1}{6}+\frac{1}{7}}{\frac{1}{6}\cdot\frac{1}{7}} = \binom{13}{6.7} = \binom{1}{6.7} = 13.$

D is correct choice.

Question 4

If A = 0.abcabc ....., then by what number A should be multiplied so as to get an integeral value?

A 2997

B 1000

C 1998

D Both 2997 and 1998

Answer: D

Explanation:

$A = 0.abcabc.....$

So, $1000A = (abc + 0.abc.....)$

or, $1000A = (abc + A)$.

or, $999A = (abc)$.

or, $A = {}^{abc}/_{999}$.

So, To get an integral value ,we should multiply A by a number which is a multiple of 999.

From choice 2997 and 1998 both are multiple of 999.

D is correct choice.

Question 5

What is the sum of
$1\frac{1}{2} + 4\frac{1}{6} + 7\frac{1}{12} + 10\frac{1}{20}$..... **upto 20 terms?**

A $\frac{12410}{21}$

B $\frac{12412}{21}$

C $\frac{12433}{21}$

D $\frac{1179}{2}$

Answer: A

Explanation:
$1\frac{1}{2} + 4\frac{1}{6} + 7\frac{1}{12} + 10\frac{1}{20}.....upto\ 20\ terms.$

Or ,we can rewrite it as :

$(1 + 4 + 7 + 10 + ... + 58) + \left(\frac{1}{2} + \frac{1}{6} + \frac{1}{12} + ... + \frac{1}{420}\right)$

$= \frac{20}{2}\{2 \times 1 + (20 - 1) \times 3\} + \left(\frac{1}{1.2} + \frac{1}{2.3} + \frac{1}{3.4} + ... + \frac{1}{20.21}\right)$

$= \frac{20 \times 59}{2}$ +

$\left(\left(1 - \frac{1}{2}\right) + \left(\frac{1}{2} - \frac{1}{3}\right) + \left(\frac{1}{3} - \frac{1}{4}\right) + ... + \left(\frac{1}{20} - \frac{1}{21}\right)\right)$

$= 590 + \left(1 - \frac{1}{21}\right).$

$= 590 + \left(\frac{20}{21}\right).$

$= \frac{12410}{21}.$

A is correct choice.

Question 6

If $\left(\frac{1}{2^1}\right) + \left(\frac{1}{2^2}\right) + \left(\frac{1}{2^3}\right) ..... \left(\frac{1}{2^{10}}\right) = \frac{1}{k}$**, then what is the value of** k**?**

A $\frac{512}{511}$

B $\frac{1024}{1023}$

C $\frac{511}{512}$

D $\frac{1023}{1024}$

Answer: B

Explanation:
$\left(\frac{1}{2^1}\right) + \left(\frac{1}{2^2}\right) + \left(\frac{1}{2^3}\right) ..... \left(\frac{1}{2^{10}}\right) = \frac{1}{k}$

or, $\frac{\left(1 - \frac{1}{2^{10}}\right)}{\left(1 - \frac{1}{2}\right)} = \frac{1}{k}.$

or, $\frac{1024 - 1}{1024} = \frac{1}{k}.$

or, $k = \frac{1024}{1023}.$

B is correct choice.

Question 7

Which of the following statement(s) is/are TRUE?

I. $1\frac{2}{3} + 2\frac{3}{4} + 3\frac{4}{5} > 8$

II. $6\frac{1}{2} - 5\frac{3}{4} + 4\frac{1}{4} > 5$

A only I

B only II

C Niether I nor II

D Both I and II

Answer: A

Explanation:

$1\frac{2}{3} + 2\frac{3}{4} + 3\frac{4}{5}$

$= \frac{5}{3} + \frac{11}{4} + \frac{19}{5}$

$= \frac{100+165+228}{60}$.

$= 98.6$.

(I) is correct choice.

$6\frac{1}{2} - 5\frac{3}{4} + 4\frac{1}{4}$

$= \frac{13}{2} - \frac{23}{4} + \frac{17}{4}$

$= \frac{26-23+17}{4}$.

$= 5.$

So, (II) is not correct choice.

A is correct choice.

Question 8

Which of the following statement(s) is/are TRUE?

I. Highest common factor of $(3^{2002} - 1)$ **and** $(3^{2002} + 1)$ **is 4**

II. $(4^{84} - 1)$ **is exactly divisible by 5**

A only I

B only II

C Niether I nor II

D Both I and II

Answer: B

Explanation:

$(3^{2002} - 1)$ *gives a lowest factor of* $(3 - 1) = 2.$

And, $(3^{2002} + 1)$ *gives a lowest factor of* $(3 + 1) = 4.$

So, they both have HCF of 2.

So, (I) is not correct.

Now,

$\frac{4^{84}-1}{5} = \frac{(4)^{84}}{5} - \frac{1}{5}$.

So, $\frac{4^{84}}{5} = reminder\ of\ (-1)^{84} = reminder\ of\ 1.$

So, $\frac{4^{84}-1}{5} = \frac{(4)^{84}}{5} - \frac{1}{5}$, it will give a reminder of (1-1)=0.

So, (II) is correct .

B is correct choice.

Question 9

Which of the following statement(s) is/are TRUE?

I. $1^{99} + 2^{99} + 3^{99} + 4^{99} + 5^{99}$ **is exactly divisible by 5**

II. $31^{11} > 17^{14}$

A only I

B only II

C Niether I nor II

D Both I and II

Answer: A

Explanation:

$\frac{1^{99}}{5} = reminder\ of\ (1)$.

$\frac{2^{99}}{5} = \frac{4^{49}\times 2}{5} = reminder\ of\ \left((-1)^{49} \times 2\right) = reminder\ of\ 3.$

$\frac{3^{99}}{5} = \frac{9^{49}\times 3}{5} = reminder\ of\ (-3) = reminder\ of\ 2.$

$\frac{4^{99}}{5} = \frac{4^{98}\times 4}{5} = reminder\ of\ 4.$

And, $\frac{5^{99}}{5} = reminder\ of\ 0.$

So, $re\min der\ of\ \left(\frac{1+3+2+4+0}{5}\right) = 0.$

So, (I) is true.

Now, we can say that :

$34^{11} > 31^{11}.$

or, $(2 \times 17)^{11} > 31^{11}.$

or, $17^{11} \times 2^4 \times 2^4 \times 2^3 > 31^{11}.$

Now, $17^{11} \times\ 17 \times 17 \times 17 > 17^{11} \times 2^4 \times 2^4 \times 2^3.$

So, $17^{11} \times\ 17 \times 17 \times 17 >\ 31^{11}.$

or, $17^{14} >\ 31^{11}.$

So, (II) is not correct.

A is correct choice.

Question 10

N = $2^{48} - 1$ **and N are exactly divisible by two numbers between 60 and 70. What is the sum of those two numbers?**

A 128

B 256

C 64

D 512

Answer: A

Explanation:

$2^{48}-1$

$=\left(2^{24}+1\right)\left(2^{24}-1\right)$

$=\left(2^{24}+1\right)\left(2^{12}+1\right)\left(2^{12}-1\right).$

$=\left(2^{24}+1\right)\left(2^{12}+1\right)\left(2^{6}+1\right)\left(2^{6}-1\right).$

So, Those two numbers are $\left(2^{6}+1\right)\ and\ \left(2^{6}-1\right).$

or, 65 and 63.

Sum of these numbers=65+63=128.

A is correct choice.

Question 11

Which of the following statement(s) is/are TRUE?

I. $\sqrt{625}+\sqrt[4]{1296}+\sqrt{1024}>90$

II. $\sqrt[3]{(\sqrt{729})}+\sqrt[4]{(\sqrt{256})}=5$

A only I

B only II

C Niether I nor II

D Both I and II

Answer: B

Explanation:

$\sqrt{625}+\sqrt[4]{1296}+\sqrt{1024}$

$=25+6+32$

$=63.$

So, (I) is not correct.

$\sqrt[3]{(\sqrt{729})}+\sqrt[4]{(\sqrt{256})}$

$=\sqrt[3]{27}+\sqrt[4]{16}$

$=3+2.$

$=5.$

So, (II) is correct choice.

B is correct choice.

Question 12

Which of the following statement(s) is/are TRUE?

I. $\sqrt{1}+\sqrt{2}+\sqrt{3}+\sqrt{4}+\sqrt{5}+\sqrt{6}>10$

II. $\sqrt{(10)}+\sqrt{(12)}+\sqrt{(14)}>3\sqrt{(12)}$

A only I

B only II

C Niether I nor II

D Both I and II

Answer: A

Explanation:
$\sqrt{1}+\sqrt{2}+\sqrt{3}+\sqrt{4}+\sqrt{5}+\sqrt{6}=10.83.$

it means that (I) is correct.

And, $\sqrt{10}+\sqrt{12}+\sqrt{14}=10.36.$

but, $3\sqrt{12}=10.39.$

So, (II) is not correct .

So, A is correct choice.

Question 13

If $y^2=y+7$, then what is the value of y^3?

A $8y+7$

B $y+14$

C $y+2$

D $4y+7$

Answer: A

Explanation:
$y^2=y+7.$

or, $y^3=y\left(y+7\right).$

or, $y^3=\left(y^2+7y\right).$

Now, given that $y^2=y+7.$,

So, $y^3=y+7+7y.$

or, $y^3=7+8y.$

A is correct choice.

Question 14

If $f(x)=(x-2)(x^2+Px+4)$ and $(x-3)$ is a factor of $f(x)$, then what is the value of P?

A 4

B -4

C $-\frac{13}{3}$

D $\frac{13}{3}$

Answer: C

Explanation:

If $f(x) = (x-2)(x^2+Px+4)$ and $(x-3)$ is a factor of $f(x)$ Let say, (x-m) is another factor of f(x).

So, $(x-3)(x-m) = x^2+Px+4$

or, $\left(x^2-3x-mx+3m\right) = \left(x^2+Px+4\right).$

or, $-x(3+m)+3m = Px+4.$

So, by comparing both side , we can say that :

$-(3+m) = P \ and \ 3m = 4.$

or, $m = \frac{4}{3}.$

So, $P = -3-\frac{4}{3} = \frac{-9-4}{3} = \frac{-13}{3}.$

C is correct choice.

Question 15

If $\left[x-\left(\frac{1}{x}\right)\right] = 2$, then what is the value of $\left[x^6-\left(\frac{1}{x^6}\right)\right]$?

A $114\sqrt{3}+1$

B $134\sqrt{2}$

C $142\sqrt{2}+3$

D $140\sqrt{2}$

Answer: D

Explanation:

$\left[x-\left(\frac{1}{x}\right)\right] = 2$

or, $\left(x-\frac{1}{x}\right)^2 = 4.$

or, $x^2+\frac{1}{x^2}-2 = 4.$

or, $x^2+\frac{1}{x^2} = 6.$

or, $\left(x^2+\frac{1}{x^2}\right)^2 = 36.$

or, $\left(x^4+\frac{1}{x^4}+2\right) = 36.$

or, $x^4+\frac{1}{x^4} = 34 \ldots\ldots\ldots\ldots\ldots (1)$

Now,

$\left(x-\frac{1}{x}\right) = 2.$

or, $x^2-2x-1 = 2.$

or, $x = \frac{2\pm\sqrt{4+4}}{2} = \frac{2\pm2\sqrt{2}}{2} = \left(1\pm\sqrt{2}\right).$

Lets consider positive root value for x.

$x^2 = \left(1+\sqrt{2}\right)^2 = 3+2\sqrt{2}.$

And, $\frac{1}{x^2} = \left(\frac{1}{1+\sqrt{2}}\right)^2 = \left(\sqrt{2}-1\right)^2 = 3-2\sqrt{2}.$

So, $x^2-\frac{1}{x^2} = 3+2\sqrt{2}-3+2\sqrt{2} = 4\sqrt{2}.$

Now,

$\left(x^4+\frac{1}{x^4}\right)\left(x^2-\frac{1}{x^2}\right) = 34\times4\sqrt{2}$

or, $x^6 - \frac{1}{x^6} - \left(x^2 - \frac{1}{x^2}\right) = 136\sqrt{2}.$

or, $x^6 - \frac{1}{x^6} - 4\sqrt{2} = 136\sqrt{2}.$

or, $x^6 - \frac{1}{x^6} = 140\sqrt{2}.$

D is correct choice.

Question 16

x, y and z all are positive number. If $3^x > 9^y$ and $2^y > 4^z$, then which of the following is TRUE?

A $x > y > z$

B $x > z > y$

C $z > y > x$

D $y > x > z$

Answer: A

Explanation:

if we consider : $3^x > 9^y$, then x must greater than y and x must greater than 2.

Let say , x=7 and y=3 , it implies that $3^5 = 243 > 9^2 = 81.$

again, if we consider : $2^y > 4^z$, then y must greater than z and y must greater than 2.

Let say, z=1, So, y=3 is greater than z.

So, it must be : $x > y > z.$

A is correct choice.

Question 17

If $x = \left(\frac{1}{8}\right)$, which of the following has the largest values?

A $\frac{x}{2}$

B x^2

C $\sqrt{x}$

D $\frac{1}{x}$

Answer: D

Explanation:

$x = \frac{1}{8}.$

So,

$\frac{x}{2} = \frac{1}{16} = 0.0625.$

$x^2 = \frac{1}{64} = 0.015625.$

$\sqrt{x} = \sqrt{\frac{1}{8}} = 0.3535.$

$\frac{1}{x} = 8.$

So, $\frac{1}{x}\ is\ largest\ .$

D is correct choice.

Question 18

If $X = \frac{1}{1+\frac{1}{1+X}}$ and $Y = \frac{2}{2+\frac{1}{1+Y}}$, then which of the following can be the value of $X + Y$

A $\frac{(-\sqrt{5}-\sqrt{17}+3)}{4}$

B $\frac{(2\sqrt{5}+\sqrt{17}-3)}{4}$

C $\frac{(-\sqrt{5}+\sqrt{17}+1)}{4}$

D $\frac{(\sqrt{5}+\sqrt{17}-1)}{4}$

Answer: B

Explanation:

$X = \frac{1}{1+\frac{1}{1+X}}$

or, $X = \frac{1+X}{1+X+1}$.

or, $X(2+X) = 1+X.$

or, $2X + X^2 = 1 + X.$

or, $X^2 + X - 1 = 0.$

or, $X = \frac{-1\pm\sqrt{1^2+4}}{2.1} = \frac{-1\pm\sqrt{5}}{2}$.

And,

$Y = \frac{2}{2+\frac{1}{1+Y}}$.

or, $Y = \frac{2+2Y}{2+2Y+1}$.

or, $Y(3+2Y) = 2+2Y.$

or, $3Y + 2Y^2 = 2 + Y.$

or, $2Y^2 + Y - 2 = 0.$

or, $Y = \frac{-1\pm\sqrt{1+16}}{2.2} = \frac{-1\pm\sqrt{17}}{4}$.

So, $X + Y = \frac{-1+\sqrt{5}}{2} + \frac{-1+\sqrt{17}}{4} = \frac{-2+2\sqrt{5}-1+\sqrt{17}}{4} = \frac{-3+\sqrt{17}+2\sqrt{5}}{4}$.(by taking positive roots.)

B is correct choice.

Question 19

If $P = 2^{29} \times 3^{21} \times 5^8, Q = 2^{27} \times 3^{21} \times 5^8, R = 2^{26} \times 3^{22} \times 5^8$ and $S = 2^{25} \times 3^{22} \times 5^9$, then which of the following is TRUE?

A $P > S > R > Q$

B $S > P > R > Q$

C $P > R > S > Q$

D $S > P > Q > R$

Answer: A

Explanation:

Let say, $M = 2^{25} \times 3^{21} \times 5^8$.

So, by rearranging above equation ,we can say that :

$P = 2^4 \times M = 16M.$

$Q = 2^2 \times M = 4M.$

$R = 2 \times 3 \times M = 6M.$

$S = 3 \times 5 \times M = 15M.$

So, $P > S > R > Q.$

A is correct choice.

Question 20

If $A = 125$ and $B = 8$, then what is the value of

$(A+B)^3 - (A-B)^3 - 6B(A^2 - B^2)$**?**

A 4096

B 4608

C 4224

D 3456

Answer: A

Explanation:

$(A+B)^3 - (A-B)^3 - 6B(A^2 - B^2)$

$= (A+B-A+B)^3 + 3(A+B)(A-B)(A+B-A+B) - 6B\left(A^2 - B^2\right).$

$= (2B)^3 + 6\left(A^2 - B^2\right)B - 6B\left(A^2 - B^2\right).$

$= (2 \times 8)^3 = 4096.$

A is correct choice.

Question 21

If $X^{y^z} = 1, Y^{z^x} = 125$ and $Z^{y^x} = 243$ (X, Y and Z are natural numbers), then what is the value of $9X + 10Y - 18Z$?

A 18

B 15

C 12

D 5

Answer: D

Explanation:

$X^{y^z} = 1$ this equation derives that 1 to the power of any thing is always 1.

So, X=1.

Now,

$Y^{z^x} = 125 \ \ implies \ that \ Y^Z = 5^3$

And,

$Z^Y = 243 \ implies \ that \ Z^Y = 3^5.$

So, Y=5 and Z=3.

So, $9X + 10Y - 18Z = 9 \times 1 + 10 \times 5 - 18 \times 3 = 59 - 54 = 5.$

D is correct choice.

Question 22

If $3x + 6y + 9z = \frac{20}{3}$, $6x + 9y + 3z = \frac{17}{3}$ and $18x + 27y - z = \frac{113}{9}$, then what is the value of $75x + 113y$?

A $\frac{163}{3}$

B $\frac{143}{6}$

C $\frac{218}{9}$

D $\frac{311}{3}$

Answer: A

Explanation:

$3x + 6y + 9z = \frac{20}{3}$.

or, $x + 2y + 3z = \frac{20}{9}$ ..... (1)

$6x + 9y + 3z = \frac{17}{3}$.

or, $2x + 3y + z = \frac{17}{9}$ ..... (2)

$18x + 27y - z = \frac{113}{9}$.

or, $72x + 108y - 4z = \frac{452}{9}$ ..... (3)

By adding (1),(2) & (3) :

$75x + 113y = \frac{452}{9} + \frac{20}{9} + \frac{17}{9} = \frac{489}{9} = \frac{163}{3}$.

A is correct choice.

Question 23

If sides of a triangle are 12 cm, 15 cm and 21 cm, then what is the inradius (in cm) of the triangle?

A $\frac{(5\sqrt{3})}{2}$

B $4\sqrt{3}$

C $\frac{(3\sqrt{6})}{2}$

D $3\sqrt{3}$

Answer: C

Explanation:

Semi perimeter, S= $\frac{15+21+12}{2} = 24.$

Area, A= $\sqrt{24\,(24-15)\,(24-21)\,(24-12)} = \sqrt{24 \times 3 \times 9 \times 12} = 36\sqrt{6}.$

So, inradius, r= $\frac{A}{S} = \frac{36\sqrt{6}}{24} = \frac{3\sqrt{6}}{2}$.

C is correct choice.

Question 24

In a triangle ABC, AB = 12, BC = 18 and AC = 15. The medians AX and BY intersect sides BC and AC at X and Y respectively. If AX and BX intersect each other at O, then what is the value of OX?

A $4\sqrt{23}$

B $\sqrt{23}$

C $2\sqrt{23}$

D $\frac{(\sqrt{23})}{(\sqrt{2})}$

Answer: D

Question 25

In a triangle PQR, PX bisects QR. PX is the angle bisector of angle P. If PQ =12 cm and QX = 3 cm, then what is the area (in cm ^{2}) of triangle PQR?

A $12\sqrt{3}$

B $8\sqrt{15}$

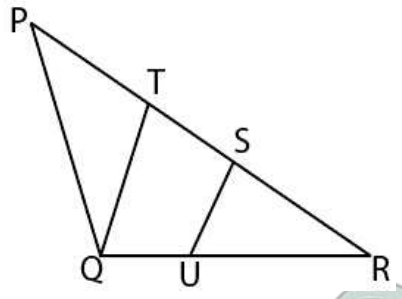
C $18\sqrt{2}$

D $9\sqrt{15}$

Answer: D

Question 26

In the given figure PT : TS : SR = 2 : 1 : 1 and SU is parallel to TQ. If RU = 10 cm. RS = 8 cm and SU = 6 cm, then what is the value (in cm) of PQ?



A 12

B 10

C 20

D 30

Answer: C

Question 27

PQ and RS are two chords of a circle. PQ = 20 cm, RS = 48 cm and PQ is parallel to RS. If the distance between PQ and RS is 34 cm, then what is the area (in cm^2) of the circle?

A 729π

B 900π

C 676π

D 784π

Answer: C

Question 28

Centre of two concentric circles is O. The area of two circles is 616 cm ^{2} and 154 cm^2 respectively. A tangent is drawn through point A on the larger circle to the smaller circle. This tangent touches small circle at B and intersects larger circle at C. What is the length (in cm) of AC?

A $12\sqrt{3}$

B $14\sqrt{3}$

C $10\sqrt{6}$

D $18\sqrt{2}$

Answer: B

General Science Notes for SSC CGL

Question 29

PA and PB are two tangents drawn to two circles of radius 3 cm and 5 cm respectively. PA touches the smaller and larger circles at points X and Y respectively. PB touches the smaller and large circle at point U and V respectively. The centres of the smaller and larger circles O and N respectively. If ON =12 cm, then what is the value (in cm) of PY?

A $5\sqrt{35}$

B $7\sqrt{15}$

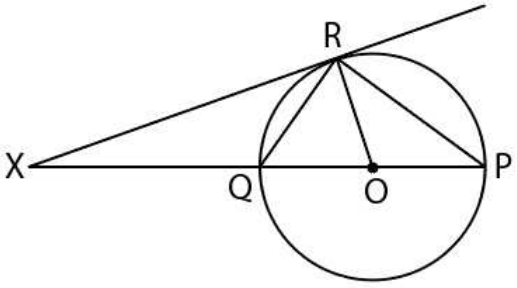
C $9\sqrt{15}$

D $12\sqrt{5}$

Answer: A

Question 30

XR is a tangent to the circle. O is the centre of the circle. If $\angle$XRP = 120°, then what is the value (in degrees) of $\angle$QOR?



A 80

B 70

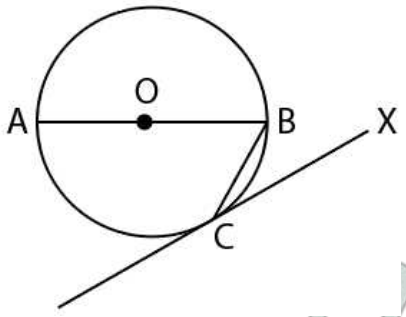
C 60

D 40

Answer: C

Question 31

O is the centre of the circle. A tangent is drawn which touches the circle at C. If $\angle$AOC = 80°, then what is the value (in degrees) of $\angle$ BCX?



A 80

B 30

C 40

D 50

Answer: D

Question 32

The distance between the centres of two circles is 24 cm. If the radius of the two circles are 4 cm and 8 cm, then what is the sum of the lengths (in cm) of the direct common tangent and the transverse common tangent?

A $4(3\sqrt{3}+\sqrt{35})$

B $4(4\sqrt{35}+3\sqrt{3})$

C $4(\sqrt{35}+3\sqrt{3})$

D $4\sqrt{3}(\sqrt{35}+3\sqrt{3})$

Answer: C

Question 33

ABC is triangle. AB = 10 cm and BC = 16 cm. AD = 8 cm and is perpendicular to side BC. What is the length (in cm) of side AC?

A $4\sqrt{41}$

B $2\sqrt{41}$

C $2\sqrt{82}$

D $4\sqrt{82}$

Answer: B

Question 34

An equilateral triangle of side 12 cm is drawn. What is the area (in cm ^{2}) of the largest square which can be drawn inside it?

A $1512 - 864\sqrt{3}$

B $3024 - 1728\sqrt{3}$

C $3024 + 1728\sqrt{3}$

D $1512 + 864\sqrt{3}$

Answer: B

Question 35

PQRS is a rectangle. The ratio of the sides PQ and QR is 3 :1. If the length of the diagonal PR is 10 cm, then what is the area (in cm ^{2}) of the rectangle?

A 15

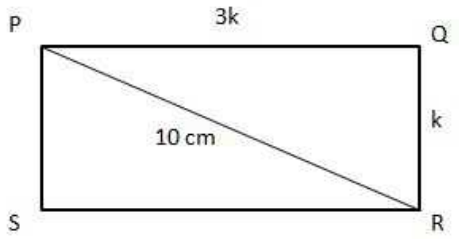
B 30

C 75

D 20

Answer: C

Explanation:



Let say, PQ=3k and QR=k .

So, $(3k)^2 + k^2 = 10^2$.

or, $k^2 = 5^2$.

or, $k = 5$.

So, PQ=15 cm and QR=5 cm.

So, Area= $PQ \times QR = 15 \times 5 = 75\ cm^2$.

C is correct choice.

Question 36

ABCDEF is a regular hexagon. What is the ratio of the area of triangle ACE and area of triangle AEF?

A 6 : 1

B 4 : 1

C 3 : 1

D 5 : 1

Answer: C

Question 37

$ABCD$ is a trapezium. Sides AB and CD are parallel to each other. AB = 6 cm, CD = 18 cm, BC = 8 cm and AD = 12 cm. A line parallel to AB divides the trapezium in two parts of equal perimeter. This line cuts BC at E and AD at F. If $\frac{BE}{EC} = \frac{AF}{FD}$, than what is the value of $\frac{BE}{EC}$?

A $\frac{1}{2}$

B 2

C 4

D $\frac{1}{4}$

Answer: C

Explanation:

Given ,

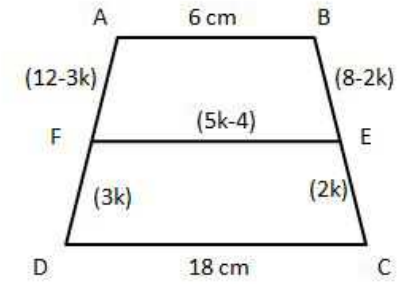
$\frac{BE}{EC} = \frac{AF}{FD}$.

So, $\frac{8-EC}{EC} = \frac{12-FD}{FD}$. $(given,\ BC = 8\ and\ AD = 12)$

So, $\frac{EC}{FD} = \frac{8}{12} = \frac{2}{3}$.

Let say, EC=2k and FD= 3k.

So,



So, AF=(12-3k) and BE=(8-2k) .

According to question :

Perimeter of ABEF= Perimeter of FECD=(6+8+18+12)/2=22 cm .

So,

$FE + 3k + 2k + 18 = 22$.

or, $FE + 12 - 3k + 8 - 2k + 6 = 22$.

or, $FE = (5k - 4)$.

Again,

$FE + CD + FD + EC = 22$.

or, $3k + 2k + 18 + 5k - 4 = 22$.

or, $10k = 8$.

or, $k = \frac{8}{10} = \frac{4}{5}$.

So, $\frac{BE}{EC} = \frac{8-2k}{2k} = \frac{8-\frac{8}{5}}{\frac{8}{5}} = \frac{40-8}{8} = 4$.

C is correct choice.

Question 38

A rectangular sheet of length 42 cm and breadth 14 cm is cut from a circular sheet. What is the minimum area (in cm ^{2}) of circular sheet?

A 3080

B 1540

C 770

D 1030

Answer: B

Explanation:

Let ABCD is a rectangular sheet of paper which has cut from a circular sheet of paper. AB=CD=42 cms. and BC=AD=14 cms. Thus diagonal AC or. BD will be the diameter of the circle. In right angled triangle ABC :-

$AC^2 = AB^2 + BC^2$

or, $(2.r)^2 = (42)^2 + (14)^2$

or, $4.r^2 = (14^2).(3^2) + (14^2).$

or, $4.r^2 = (14^2).(9+1) = 196 \times 10.$

or, $r^2 = 49 \times 10 = 490 \ldots\ldots\ldots\ldots (1)$

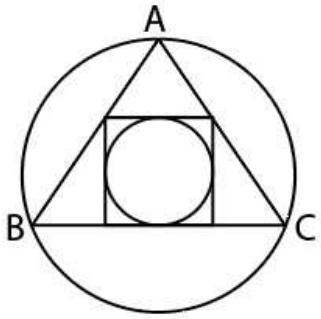
Minimum area of circular sheet of paper $= \pi.r^2., putting r^2 = 490 from eqn.(1).$

=(22/7)×490= 1540 sq.unit.

B is correct choice.

Question 39

An equilateral triangle ABC is inscribed in a circle as shown in figure. A square of largest possible area is made inside this triangle as shown. Another circle made inscribing the square. What is the ratio of area of large circle and the small circle?



A $(15 - 12\sqrt{3}) : 1$

B $(63 - 36\sqrt{3}) : 4$

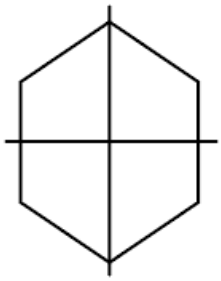
C $(7 - 4\sqrt{3}) : 8$

D $(18-\sqrt{3}):2$

Answer: B

Question 40

A prism has a regular hexagonal base whose side is 12 cm. The height of the prism is 24 cm. It is cut into 4 equal parts by 2 perpendicular cuts as shown in figure. What is the sum of the total surface area of the four parts ?



A $1728+432\sqrt{3}$

B $2880+1008\sqrt{3}$

C $2880+432\sqrt{3}$

D $1728+1008\sqrt{3}$

Answer: B

Question 41

Four identical cones each of radius 10.5 cm and height 14 cm are cut from a cuboid of dimensions $30cm \times 32cm \times 40cm$ (base of each cone lies on the surface of cuboid). What is the total surface area (in cm^2) of the remaining solid?

A 6528

B 7804

C 5926

D 6824

Answer: B

Explanation:

The surface S_{cone} of a cone can be divided into two parts, the slanting surface S_{slant} and the base disc surface S_{disc}.

$S_{cone} = S_{slant} + S_{cone}$.

When you cut out a cone from a cuboid, assuming you cut it out such that the base disc of the cone coincides with one of the surfaces of the cuboid, the surface of the cuboid loses the area coinciding with the base disc, but gains the slanting area. If you do this four times, the final surface area of the remaining solid is

$S_{cuboid} + 4S_{slant} - 4S_{disc}$.

So, $4S_{slant} = 4\pi r\sqrt{r^2+h^2} = 4 \times \frac{22}{7} \times 10.5\sqrt{10.5^2+14^2} = 2310$.

And, $4S_{disc} = 4\pi r^2 = 4 \times \frac{22}{7} \times 10.5^2 = 1386$.

And, $S_{coboid} = 2(lb+lh+bh) = 2(30\times40+30\times32+32\times40) = 6880$.

So, required surface area = $6880 + 2310 - 1386 = 7804\ cm^2$.

B is correct choice.

Question 42

A hollow cylinder of thickness 0.7 cm and height 15 cm is made of iron. If inner radius of cylinder is 3.5 cm, then what is the total surface area (in cm^2) of the hollow cylinder?

A 812.12

B 768.42

C 759.88

D 828.42

Answer: C

Explanation:

inner radius,$r_2 = 3.5\ cm.$ and outer radius, $r_1 = (0.7 + 3.5\ )\ cm = 4.2\ cm.$

$Later\ surface\ \ area\ \ = \ 2\pi h\left(r_1 + r_2\right).$

Total surface area = $2\pi h\left(r_1 + r_2\right) + 2\pi\left(r_1^2 - r_2^2\right).$

$= \ 2 \times \frac{22}{7} 15\left(3.5 + 4.2\right) + 2 \times \frac{22}{7}\left(4.2^2 - 3.5^2\right).$

$= \ 726 + 33.88$

= 759.88 cm.

C is correct choice.

Question 43

A hollow cylinder has height 90 cm and the outer curved surface area is 11880 cm^2. It can hold 55440 cm^3 of air inside it. What is the thickness (in cm) of this cylinder?

A 10.5

B 14

C 7

D 3.5

Answer: C

Explanation:

Let say, radius of inside of cylinder = r cm.

So, $\pi r^2 h\ = \ 55440.$

or, $r\ = \ 14.$ (h = 90 cm)

Let say, Curved surface area = $2\pi h\left(R + r\right)$.

So, $2\pi h\left(R + r\right) = 11880.$

or, $(R + r) = \frac{11880}{2\pi h} = \frac{11880 \times 7}{2 \times 22 \times 90} = 21.$

So, $R = 21 - r = 21 - 14 = 7.$

Thickness of cylinder is 7 cm.

C is correct choice.

Question 44

A hollow sphere is melted to form small identical! hollow spheres. Inner and outer radius of the bigger sphere are 4 cm and 6 cm respectively. If inner and outer radii of the smaller sphere are 2 cm and 3 cm respectively, then how many smaller spheres can be formed?

A 4

B 8

C 6

D 12

Answer: B

Explanation:
Let say, n number of sphere can be made.

So,According to question,

$\frac{4}{3}\pi\left(R^3-r^3\right)=n\times\frac{4}{3}\pi\left(R_1^3-r_1^3\right).$

or, $\frac{4}{3}\pi\left(6^3-4^3\right)=n\times\frac{4}{3}\pi\left(3^3-2^3\right).$

or, $(216-64)=n\times(27-8).$

or, $n=\frac{152}{19}=8.$

B is correct choice.

Question 45

A hemispherical dome is open from its base and is made of iron. Thickness of dome is 3.5 meter. Total cost of painting domes outer curved surface is Rs 2464. If the rate of painting is Rs 8 per meter^2, then what is the volume (in meter ^{3}) of iron used in making dome?

A 656.42

B 614.21

C 524.46

D 628.83

Answer: D

Explanation:
Total cost of painting domes outer curved surface is Rs 2464.

And the rate of painting is Rs 8 per meter ^{2}.

So, Total curved surface area = $\frac{2464}{8}\ m^2=308\ m^2.$

So, $2\pi r^2=308.$

or, $r^2=\frac{308}{2\pi}=49.0197.$

or, $r=7.0014.$

So, Total Volume = $\frac{2}{3}\pi r^3=\frac{2}{3}\pi\times7.0014^3=718.8086\ m^3.$

Volume of inside = $=\frac{2}{3}\pi\times3.5^3=89.7971\ m^3.$

So, Volume of iron = $(718.80-89.7971)\ m^3\simeq\ 629\ m^3.$

D is correct choice.

Question 46

A solid cuboid has dimensions $14cm \times 18cm \times 24cm$. A hemisphere of radius 3.5 cm is cut from the centre of each face of cuboid. What is the total surface area (in cm^2)of the remaining solid?

A 1902

B 1809

C 1706

D 2271

Answer: D

Explanation:
Total surface area of the remaining solid = Total surface area of cuboid + 6 × CSA of hemisphere - 6 × Area of the circular base

$\Rightarrow 2(lb + bh + lh) + 6 \times 2\pi R^2 - 6 \times \pi R^2 = 2(lb + bh + lh) + 6 \times \pi R^2.$

⇒ 2 × (14 × 18 + 18 × 24 + 24 × 14) + 6 × 22/7 × 3.5 × 3.5

⇒ 2 × 12 × (7 × 3 + 18 × 2 + 2 × 14) + 6 × 22 × 0.5 × 3.5

$\Rightarrow 24 \times 85 + 231 = 2271cm^2$

D is correct choice.

Question 47

A right pyramid with square base has side of base 12 cm and height 40 cm. It is kept on its base. It is cut into 4 parts of equal heights by 3 cuts parallel to its base. What is the ratio of volume of the four parts?

A 1 : 8 : 27 : 70

B 1 : 7 : 19 : 47

C 1 : 7 : 19 : 37

D 1 : 8 : 27 : 64

Answer: C

Question 48

What is the value of $2 \sin 15° \cos 15° - 4 \sin^3 15° \cos 15°$?

A $\frac{3}{\sqrt{3}}$

B $\frac{\sqrt{3}}{2}$

C $\frac{\sqrt{3}}{4}$

D $\frac{1}{2}$

Answer: C

Question 49

If $\sin x = \frac{1}{2}$ and $\sin y = \frac{2}{3}$, then what is the value of $\left[\frac{(6\cos^2 x - 4\cos^4 x)}{(18\cos^2 y - 27\cos^4 y)}\right]$

A $\frac{27}{20}$

B $\frac{15}{14}$

C $\frac{25}{21}$

D $\frac{17}{14}$

Answer: A

Question 50

What is the value of $\cos 15° + \cos 105°$**?**

A $\sqrt{3}$

B $\frac{1}{\sqrt{2}}$

C $\frac{\sqrt{3}}{2}$

D $\frac{1}{\sqrt{3}}$

Answer: B

Question 51

If $\sin(A-B) = \frac{1}{2}$ **and** $\cos(A+B) = \frac{1}{2}$**, then what is the value of** $\sin A \cos A + \sin^2 A \sin B \cos B + \cos^3 A \cos B \tan A$**?**

A $\frac{1}{2}$

B $\frac{3}{4}$

C $\frac{1}{4}$

D $\frac{3}{2}$

Answer: B

Question 52

What is the value of $\cos(90 + 75°)$**?**

A $2 + \sqrt{3}$

B $-2 - \sqrt{3}$

C $\sqrt{3} + 1$

D $-\sqrt{3} - 1$

Answer: A

Question 53

If $(A+B+C)=90°$, then what is the value of $\sin\left(\frac{A}{2}\right)\sin\left[\frac{(180—B—C)}{2}\right]+\cos\left(\frac{A}{2}\right)\sin\frac{(B+C)}{2}$?

A $\frac{1}{2}$

B 1

C $\frac{1}{\sqrt{2}}$

D $\frac{\sqrt{3}}{2}$

Answer: C

Question 54

What is the value of $\cot(90-x)\sin^4(90-x)+\cot(180-x)\sin^4(180-x)$?

A $\frac{(\cos 4x)}{4}$

B $\frac{(\sin^2 2x)}{2}$

C $\frac{(\cos^2 2x)}{2}$

D $\frac{(\sin 4x)}{4}$

Answer: D

Question 55

A flag of height 4 metres is standing on the top of a building. The angle of elevation of the top of the flag from a point X is 45° and the angle of elevation of the top of building from X is 30°. Point X is on the ground level. What is the height (in metres) of the building?

A $\sqrt{3}+2$

B $2(\sqrt{3}+1)$

C $4(\sqrt{3}+1)$

D $(\sqrt{3}+1)$

Answer: B

Question 56

Height of a tower is 120 metres. The angle of elevation of the top of tower from a point B is 75°. Point B is on the ground level. What is the distance (in metres) of point B from the base of tower?

A $120(2-\sqrt{3})$

B $180(3-\sqrt{3})$

C $180(\sqrt{3}-1)$

D $150(\sqrt{3}-1)$

Answer: A

Question 57

Mohit is standing at some distance from a 60 meters tall building. Mohit is 1.8 meters tall. When Mohit walks towards the building, then the angle of elevation from his head becomes 60° from 45°. How much distance (in metres) Mohit covered towards the building?

A $18.6(4-\sqrt{3})$

B $58.2-24.6\sqrt{3}$

C $19.4(\sqrt{3}+1)$

D $19.4(3-\sqrt{3})$

Answer: D

Instructions

The table given below shows the ratio of cars and Bikes manufactured by 5 different companies. The table also shows the ratio of three different types of cars Cl, C2 and C3 and three different types of bikes al, B2 and B3 manufactured by these 5 different companies. Total numbers of car and bikes together manufactured by D, E, F, G and H are 300000, 280000, 320000, 400000 and 480000 respectively.

Company	Car : Bike	C1 : C2 : C3	B1 : B2 : B3
D	1:02	2:03:05	2:02:01
E	3:01	1:01:01	2:03:02
F	1:01	2:01:01	1:01:02
G	3:01	2:03:01	1:02:02
H	1:02	1:02:01	2:01:05

Question 58

Total number of bikes manufactured by company D is what percentage of total number of cars of type C1 manufacture by company G?

A 50

B 100

C 200

D 150

Answer: C

Question 59

What is the average of the total number of cars of type Cl manufactured by the given 5 companies?

A 58000

B 60000

C 56000

D 62000

Answer: D

Question 60

What is the difference between the total number of C3 type car manufactured by company E and G together and the number of bikes of type B1 manufactured by company H?

A 44000

B 40000

C 48000

D 42000

Answer: B

Question 61

H = Total number of B2 type bike manufactured by all the companies.
R = Total number of C1 type car manufactured by company F, G and D together.
What is the value of H/R?

A 0.625

B 1.35

C 1.15

D None of these

Answer: C

Question 62

A = Total number of cars manufactured by all the companies.
K = Difference between the number of C3 type cars manufactured by company H and the number of B3 type bike manufactured by company E.
What is the value of A : K?

A 91 : 2

B 93 : 2

C 181 : 4

D 185 : 4

Answer: B

Instructions
For the following questions answer them individually

Question 63

How many litres of water should be added to a 7.5 litre mixture of acid and water containing acid and water in the ratio of 1 : 2 such that the resultant mixture has 20% acid in it?

A 10

B 2.5

C 7.5

D 5

Answer: D

Question 64

In what ratio should cement costing Rs 250 per bag be mixed with cement costing Rs 325 per bag so that the cost of the mixture is Rs 300 per bag. (A bag of cement is 50 kg).

A 1 : 2

B 2 : 1

C 3 : 2

D 2 : 3

Answer: A

SSC CGL Important Questions PDF

Question 65

A started a trading firm by investing Rs 10 lakhs. After 4 months, B joined the business by investing Rs 15 lakhs then 2 months after B joined C too joined them by investing Rs 20 lakhs. 1 year after A started the business they made Rs 6,00,000 in profit. What is C's share of the profit (in Rs)?

A 2,00,000

B 1,00,000

C 1,50,000

D 3,00,000

Answer: A

Question 66

A and B started a partnership business investing in the ratio of 2 : 5. C joined them after 3 months with an amount equal to 4/5th of B. What was their profit (in Rs) at the end of the year if A got Rs 16,800 as his share?

A 56000

B 100800

C 84000

D 117600

Answer: C

Question 67

Working alone A can do a work in 72 days and B in 90 days. If they work on it together for 10 days, then what fraction of work is left?

A $\frac{1}{4}$

B $\frac{3}{5}$

C $\frac{1}{5}$

D $\frac{3}{4}$

Answer: D

SSC CHSL Prevoius Papers (DOWNLOAD PDF)

Question 68

A, B and C together can build a wall in 12 days. C is four times as productive as B and A alone can build the wall in 48 days. In how many days A and B working together can build the wall?

A 20

B 30

C 80

D 40

Answer: B

Question 69

Working together A and B can do a job in 36 days, B and C in 10 days and all three together in 9 days. In how many days can B alone do the job?

A 90

B 30

C 24

D 60

Answer: D

Question 70

A can do $\frac{1}{5}$ of a job in 10 days, B can do $\frac{1}{3^{rd}}$ of the job in 25 days. In how many days can they do half of the job working together?

A 30

B 45

C 15

D 20

Answer: C

General Science Notes for SSC CGL

Question 71

1 bar of chocolate costs Rs 80 but a box containing 6 bars of the same chocolate costs Rs 400. What is the effective discount (in %) on the box?

A 20

B 16.67

C 25

D 15

Answer: B

Question 72

15% discount is offered on a shirt marked at Rs 1200. But the shirt is sold at Rs 918 after giving a further cash discount. How much is this cash discount (in %)?

A 10

B 12

C 5

D 8

Answer: A

Question 73

A retailer marks up his goods by 30% and offers 15% discount. What will be the selling price (in Rs) of an item sold by the retailer if its cost to the retailer is Rs 1,000?

A 1050

B 1105

C 805

D 1225

Answer: B

Question 74

The selling price of a smartphone is Rs 9,600 if the discount on it is 20%. What would be the selling price (in Rs) of the smartphone if the discount on it was 25%?

A 10240

B 7680

C 1200

D 9000

Answer: D

Question 75

The wages of three labourers A, B and C are in the ratio 10:12:15. As wage is increased in the ratio 5:6, B's wage is increased in the ratio 3:4 and C's wage is increased in the ratio 3:5. The new ratio of the wages of A:B:C is .....

A 15 : 18 : 20

B 12 : 16 : 25

C 6 : 7 : 9

D 8 : 6 : 5

Answer: B

Question 76

The ratio of present ages of Ajay and Vijay is 2:3. 4 years ago the ratio of their ages was 3:5. What is Vijay's present age (in years)?

A 16

B 8

C 32

D 24

Answer: D

SSC CHSL Free Mock Test

Question 77

If 12A = 16B = 15C; find A : B : C.

A 12 : 16 : 15

B 15 : 16 : 12

C 20 : 15 : 16

D 16 : 15 : 20

Answer: C

Question 78

Find the third proportional to 16 and 20?

A 24

B 25

C 32

D 40

Answer: B

Question 79

Find the number of students who took an exam if the ratio of those who passed to those who failed in the exam was 10 : 3. If 40 more students had taken the exam and 10 less had failed, then the ratio of those who passed to those who failed in the exam would have been 5 :1.

A 200

B 250

C 300

D 260

Answer: D

Question 80

The ratio of the bank balance of three brothers A, B and C is 10 :12 : 5. B transfers Rs 60,000 from his account to C's. The new ratio of the bank balances becomes 10 : 9 : 8. What is the bank balance of A (in Rs)?

A 100000

B 200000

C 300000

D 400000

Answer: B

Question 81

In a set of three numbers, the average of first two numbers is 21, the average of the last two numbers is 24, and the average of the first and the last numbers is 15. What is the average of three numbers?

A 20

B 60

C 25

D 18

Answer: A

Question 82

In a club there are 12 wrestlers. When a wrestler whose weight is 90 kg leaves the club, he is replaced by a new wrestler then the average weight of this 12 member club increases by 0.75 kg. What is the weight (in kg) of the new wrestler who joined the club?

A 108

B 99

C 112

D 100

Answer: B

Question 83

A zoo has an average of 500 visitors on Sundays and 200 on other days. The average number of visitors per day in a month of 30 days beginning with a Sunday is:

A 225

B 275

C 300

D 250

Answer: D

Question 84

The average of 35 consecutive even numbers is 44. Find the smallest number.

A 8

B 12

C 10

D 14

Answer: C

Question 85

If a shopkeeper sells a mixer at Rs 11,400 then he suffers a loss of 5%. At what price (in Rs) should he sell the mixer to gain 10%?

A 9845

B 10909

C 13200

D 11913

Answer: C

SSC CGL Free Mock Test (Latest Pattern)

Question 86

A grain trader has 100 bags of rice. He sold some bags at 10% profit and rest at 20% profit. His overall profit on selling these 100 bags was 14%. How many bags did he sell at 20% profit?

A 40

B 50

C 60

D 70

Answer: A

Question 87

By selling 21 pots at Rs 2,520, there is a loss equal to the cost price of 3 pots. Find the cost price (in Rs) of each pot.

A 140

B 150

C 160

D 180

Answer: A

Question 88

The profit margin on a sofa set is 100%. If the cost price of the sofa set falls by 20% then what will be the new profit margin (in %)?

A 150

B 120

C 200

D 180

Answer: A

Question 89

150% of 0.05% of x is 75. Find x.

A 1,00,000

B 75000

C 1,25,000

D 1,50,000

Answer: A

Question 90

A student multiplied a number by $\frac{4}{5}$ instead of $\frac{5}{4}$. What is the percentage error in the calculation?

A 16

B 25

C 36

D 20

Answer: C

Question 91

Elections were held in a society to elect a chairman. There were only two candidates A and B. Candidate B got 25% less votes than candidate A. The number of members who did not cast the vote was same as the number of votes that candidate B got. By how many votes did A win if the society had 20,000 members.

A 6000

B 4000

C 8000

D 2000

Answer: D

Question 92

250% of a = b, then b% of 250 is the same as a% of .....

A 625

B 1000

C 100

D 6250

Answer: A

Question 93

A bullet shoots 500 m in 0.2 seconds. What is its speed in km/hr?

A 1000

B 900

C 100

D 9000

Answer: D

Question 94

A taxi goes from City A to City B at an average speed of 84 km/hr. In the return journey due to traffic the average speed of the taxi falls by 24 km/hr. Find the average speed of the taxi (in km/hr) for the total journey.

A 72

B 75

C 70

D 68

Answer: C

Question 95

A jogger covered a certain distance at some speed. Had he moved 3 km/hr faster, he would have taken 20 minutes less. If he had moved 1 km/hr slower, he would have taken 10 minutes more. What is the distance (in km) that he jogged?

A 9

B 10

C 12

D 8

Answer: C

Question 96

Ramesh travels by bus from city A to city B at an average speed of 44 km/hr. Suresh travels by taxi from city A to city B at an average speed of 77 km/hr and takes 3 hours lesser than time taken by Ramesh. What is the distance (in km) between the two cities?

A 363

B 308

C 280

D 336

Answer: B

Question 97

n 4 years at simple interest the principal increases by 12%. Calculate the amount (in Rs) received at the end of 2 years on Rs 20,000 at the same rate if compounded annually?

A 21632

B 21218

C 22472

D 22400

Answer: B

Question 98

Find the difference (in Rs) in the interest earned on Rs 10,00,000 at 10% in 1 year compounded annually and semi-annually.

A 250

B 1000

C 100

D 2500

Answer: D

Question 99

A bank gives Rs 25,000 on a saving a certain principal in 2 years at 8% rate of interest. How much will the bank give (in Rs) on the same principal in 4 years at the same rate of interest compounded annually?

A 27000

B 29000

C 29160

D 27080

Answer: C

Question 100

Find the rate of interest (in %) if simple interest earned on a certain sum for the 3 years is Rs 900 and compound interest earned in 2 years is Rs 636?

A 12

B 10

C 9

D 8

Answer: A