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## Mixed Quant for SSC Exams.

## SSC Maths Quiz 15

Directions: Read the following questions carefully and choose the right answer.

1. The population of a town is $\mathbf{3 1 2 5 0}$. If the population increases by $20 \%$ in one year, but decreases in second year by $20 \%$ and the process goes like this for 6 years. Find the number of women after 6 years if the ratio of women, child and men after 6 years is $5: 3$ : 1.
A. 15360
B. 12560
C. 13630
D. 16930
2. The ratio of efficiency of $P$ is to $R$ is $7: 4$ and the ratio of number of days taken by $Q$ is to $R$ is $\mathbf{2 : 3}$ while working alone $P$ takes 9 days less than $R$ to complete the work. If $Q$ and $\mathbf{R}$ started the work and left after $\mathbf{2}$ days then find the number of days taken by $\mathbf{P}$ to finish the remaining work?
A. $\frac{64}{7}$ days
B. 8 days
C. $\frac{32}{7}$ days
D. $\frac{128}{7}$ days
3. Two trains are moving in the opposite direction and their speeds are in the ratio of 2 : 1. If the first train crosses a standing man in 5 sec and another train crosses the same man in $8 \mathbf{s e c}$, then determine the time taken by trains to cross each other.
A. 6 sec
B. 3 sec
C. 5 sec
D. 9 sec
4. A solid hemisphere is attached to the base of the right circular cone of diameter 20 cm and height 10 cm if this object is to be inscribed in a right circular cylinder then find the vacant space left in the cylinder?
A. $500 \pi \mathrm{~cm}^{3}$
B. $2000 \pi \mathrm{~cm}^{3}$
C. $100 \pi \mathrm{~cm}^{3}$
D. $1000 \pi \mathrm{~cm}^{3}$
5. The radii of two concentric circles are 12 cm and 6 cm . AB is the diameter of the bigger circle and $B D$ is a tangent to the smaller circle touching it at $D$ and the bigger circle at $E$ in such a way that it forms an angle of $\mathbf{9 0}$ degree at $E$ with $A$. Point $A$ is joined to $D$. The length of AD is -
A. 8 cm
B. 3 V 3 cm
C. 6 V 7 cm
D. 12 cm
6. Two poles of equal height are standing opposite to each other on either side of a road which is 200 m wide. From a point between them on road, angle of elevation of their top are $30^{\circ}$ and $60^{\circ}$. The height of each pole (in meters)
A. 50 V 3 meters
B. 45 V 3 meters
C. 40 V 3 meters
D. 25 V 3 meters
7. The ratio of sides of two regular polygons is $\mathbf{1 : 2}$ and the ratio of their internal angles is $4: 5$. The number of sides of the polygons are:
A. 3,6
B. 4,8
C. 6,18
D. 6,12
8. Cost price and marked price of an article are in the ratio of $2: 3$ while selling price and marked price are in the ratio of $3: 4$. If the profit attained on the article was Rs. 65 then find the discount percent?
A. $40 \%$
B. $25 \%$
C. 10\%
D. $20 \%$
9. The average marks scored by Rakesh in 6 out of seven subjects in an examination is 76. To get an average of $\mathbf{7 0}$ in seven subjects together, what is the score that Rakesh must get in seventh subject?
A. 54
B. 84
C. 24
D. 34
10. A milkman has 35 litres of milk in one container and 105 litres of milk in another container. Find the maximum capacity of container in $\mathrm{cm}^{3}$ which can measure milk of either containers in whole number.
A. 30,000
B. 40,000
C. 35,000
D. 45,000

## Correct Answers:

| $\mathbf{1}$ | $\mathbf{2}$ | $\mathbf{3}$ | $\mathbf{4}$ | $\mathbf{5}$ | $\mathbf{6}$ | $\mathbf{7}$ | $\mathbf{8}$ | $\mathbf{9}$ | $\mathbf{1 0}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| A | A | A | D | C | A | D | B | D | C |

## Explanations :

1. The total change factor of population of 6 years is given as
$\frac{6}{5} \times \frac{4}{5} \times \frac{6}{5} \times \frac{4}{5} \times \frac{6}{5} \times \frac{4}{5}$
$\Rightarrow \frac{13824}{15625}$
The new population $=\frac{13824}{15625} \times 31250=27648$
Population of women after 6 years $=\frac{5}{9} \times 27648=15360$
Hence, Option A is correct.
2. Here the ratio of efficiencies of $P$ and $R$ is $7: 4$.

So, the number of days taken by $P$ and $R$ be $4 x$ and $7 x$.
And we know that P takes 9 days less than R to complete the work.
$\Rightarrow 7 \mathrm{x}-4 \mathrm{x}=9$
$\Rightarrow 3 x=9$
$\therefore \mathrm{x}=3$ days
So, time taken by P and R to complete the work is 12 days and 21 days respectively.
We have the ratio of the no. of days taken by $Q$ and $R$ to complete the work $=2: 3$
Now, time taken by $Q$ to complete the work $=\frac{2}{3} \times 21=14$ days
Now, work done by $Q$ and $R$ together in 1 day
$\left(\frac{1}{14}+\frac{1}{21}\right)=\frac{3+2}{42}=\frac{5}{42}$
So, work done by $Q$ and $R$ in 2 days $=2 \times \frac{5}{42}=\frac{5}{21}$
Remaining work $=1-\frac{5}{21}=\frac{16}{21}$
Time taken by $P$ to complete $16 / 21$ of the work $=12 \times \frac{16}{21}=64 / 7$ days
Thus, P will take 64/7 days to complete the remaining work.
Hence, Option A is correct.
3. Let the speeds be $2 x$ and $x$ with the lengths $I_{1}$ and $I_{2}$ respectively.

We have
$\mathrm{I}_{1}=2 \mathrm{x} \times 5=10 \mathrm{x}$
$\mathrm{I}_{2}=\mathrm{x} \times 8=8 \mathrm{x}$
Now, let the time taken by them to cross each other be $t$
Therefore, $2 \mathrm{x}+\mathrm{x}=\frac{10 \mathrm{x}+8 \mathrm{x}}{\mathrm{t}}$
$\Rightarrow 3 \mathrm{x}=\frac{18 \mathrm{x}}{\mathrm{t}}$
Or, $\mathrm{t}=6 \mathrm{sec}$
Hence, Option A is correct.
4. Using the information given we can create a following figure


We have,
Height of cone $=10 \mathrm{~cm}$
Radius of cone $=\frac{20}{2} \mathrm{~cm}=10 \mathrm{~cm}$
So, Radius of Cylinder $=10 \mathrm{~m}$
Radius of hemisphere $=10 \mathrm{~cm}$ and, Total height of cylinder $=10+10=20 \mathrm{~cm}$
Now, Volume of object = Volume of hemisphere + volume of cone
$=\frac{2}{3} \pi \times(10)^{3}+\frac{1}{3} \pi \times(10)^{2} \times 10$
$=\frac{2}{3} \pi \times 1000+\frac{1}{3} \pi \times 1000=1000 \pi \mathrm{~cm}^{3}$
Volume of cylinder $=\pi \times(10)^{2} \times(20)=200 \pi \mathrm{~cm}^{3}$
Vacant space left in the cylinder $=(2000 \pi-1000 \pi) \mathrm{cm}^{3}=1000 \pi \mathrm{~cm}^{3}$
Hence, option D is correct.
5. Let the centre of the circle be 0 .


Given $O B=12 \mathrm{~cm}$ and $\mathrm{OD}=6 \mathrm{~cm}$
clearly, $\angle O D B=90^{\circ}$ and
$B E=\frac{1}{2} D B=\frac{1}{2} D E$,
$A B=24 \mathrm{~cm}$.

From $\triangle O D B$,
So, $D B 2=O B^{2}-O D^{2}=12^{2}-6^{2}=108$
$\Rightarrow \mathrm{DB}=6 \mathrm{~V} 3 \mathrm{~cm}$

Then, $\mathrm{BE}=12 \mathrm{~V} 3 \mathrm{~cm}$

Again, from $\triangle A E B$

As, $\angle A E B=90^{\circ}$
$A B^{2}=A E^{2}+B E^{2}$
$\Rightarrow A E^{2}=A B^{2}-B E^{2}$

And, from $\triangle A E D$,
$A D^{2}$
$=A E^{2}+D E^{2}=A B^{2}-B E^{2}+D E^{2}=24^{2}-(12 \sqrt{ } 3)^{2}+108 \quad[$ Since $D E=B D]=576-432+108=252$
$\therefore$ The length of $A D=252=6 \mathrm{~V} 7 \mathrm{~cm}$.
Hence, Option (C) is correct.
6.

$A B=C D=h$ meter (height of pole)
From $\triangle \mathrm{ABE}$,
$\tan 30^{\circ}=\frac{\mathrm{h}}{\mathrm{x}} \Rightarrow \frac{1}{\sqrt{ } 3}=\frac{\mathrm{h}}{\mathrm{x}}$
$x=h \sqrt{ } 3$ $\qquad$

From $\triangle$ DEC,
$\tan 60^{\circ}=\frac{h}{200-x} \Rightarrow v 3=\frac{h}{200-x}$
$h=\sqrt{ } 3(200-x)$ (ii)
putting $x=h V 3$ in eq. (ii)
h = V $3(200-h \sqrt{ })$
$h=200 \mathrm{~V} 3-3 \mathrm{~h}$
$4 h=200 \mathrm{~V} 3$
$h=50 \sqrt{ } 3$ meters

Hence, Option A is correct.
7.

Internal angle of a regular polygon $=\frac{(n-2) \times 180}{n}$
It's given that the sides of the two polygons are in the ratio $1: 2$ and the ratio of the internal angles are 4:5.

Hence, $\frac{\frac{(n-2) \times 180}{n}}{\frac{(2 n-2) \times 180}{2 n}}=\frac{4}{5}$
$\Rightarrow \frac{2 n-4}{2 n-2}=\frac{4}{5}$
$\Rightarrow 10 n-20=8 n-8$
$2 \mathrm{n}=12 \Rightarrow \mathrm{n}=6$
They are in the ratio 1:2
1 represents 6
So, 2 represents 12
So, sides are $(6,12)$
Hence, Option D is correct.
8. Here, ratio of cost price and market price $=2: 3$ and, ratio of selling price and marked price $=3: 4$

Thus, ratio of cost price : selling price : marked price $=8: 9: 12$
So, the cost price $=8 \mathrm{x}$
Selling price $=9 x$
Marked price $=12 x$
We know that the profit attained after the article is Rs. 65
$\Rightarrow 9 x-8 x=65$
$\therefore \mathrm{x}=$ Rs. 65
$\Rightarrow$ Cost price = Rs. 520
$\Rightarrow$ Selling price $=$ Rs. 585
$\Rightarrow$ Marked price $=$ Rs. 780
Now, Discount $\%=\frac{780-585}{780} \times 100=25 \%$
Here, Percent discount offered was 25\%
Hence, Option B is correct.
9. Total marks of 6 subjects at an average of 76 marks per subject $=6 \times 76=456$

Total marks of 7 subjects at an average of 70 marks per subject $=7 \times 70=490$

Therefore, marks in seventh subject $=490-456=34$

Hence, Option D is correct.
10. In such questions, we have to find HCF

HCF of 35 and 105 is 35.

Therefor the maximum capacity of container $=35$ litres
We know that $1000 \mathrm{~cm}^{3}=1$ litre

Therefore,
35 litres $=1000 \times 35 \mathrm{~cm}^{3}=35000 \mathrm{~cm}^{3}$
Hence, Option C is correct.

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