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Pune Mahanagar Parivahan Mahamandal Limited (PMPML)



PMPML Driver Cleaner Quantitative Aptitude Sample Paper



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(1) A hollow iron pipe is 21 cm long and its external diameter is 8 cm. If the thickness of the pipe is 1 cm and iron weighs 8 g/cm^3 , then the weight of the pipe is:

- [A] 3.6 kg
 [B] 3.696 kg
 [C] 36 kg
 [D] 36.9 kg

Answer : [B]

Explanation:

External radius = 4 cm,

Internal radius = 3 cm.

$$\begin{aligned} \text{Volume of iron} &= \left(\frac{22}{7} \times [(4)^2 - (3)^2] \times 21 \right) \text{cm}^3 \\ &= \left(\frac{22}{7} \times 7 \times 1 \times 21 \right) \text{cm}^3 \\ &= 462 \text{ cm}^3. \end{aligned}$$

∴ Weight of iron = $(462 \times 8) \text{ gm} = 3696 \text{ gm} = 3.696 \text{ kg}$.

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(2) 50 men took a dip in a water tank 40 m long and 20 m broad on a religious day. If the average displacement of water by a man is 4 m^3 , then the rise in the water level in the tank will be:

- [A] 20 cm
 [B] 25 cm
 [C] 35 cm
 [D] 50 cm

Answer : [B]

Explanation:

Total volume of water displaced = $(4 \times 50) \text{ m}^3 = 200 \text{ m}^3$.

∴ Rise in water level = $\left(\frac{200}{40 \times 20} \right) \text{ m} = 0.25 \text{ m} = 25 \text{ cm}$.

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(3) The curved surface area of a cylindrical pillar is 264 m^2 and its volume is 924 m^3 . Find the ratio of its diameter to its height.

- [A] 3 : 7
 [B] 7 : 3
 [C] 6 : 7
 [D] 7 : 6

Answer : [B]

Explanation:

$$\frac{\pi r^2 h}{2\pi r h} = \frac{924}{264} \Rightarrow r = \left(\frac{924 \times 2}{264} \right) = 7 \text{ m.}$$

$$\text{And, } 2\pi r h = 264 \Rightarrow h = \left(264 \times \frac{7}{22} \times \frac{1}{2} \times \frac{1}{7} \right) = 6 \text{ m.}$$

$$\therefore \text{ Required ratio} = \frac{2r}{h} = \frac{14}{6} = 7 : 3.$$

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(4) What is the total surface area of a right circular cone of height 14 cm and base radius 7 cm?

[A] 344.35 cm²

[B] 462 cm²

[C] 498.35 cm²

[D] None of these

Answer : [C]

Explanation:

$$h = 14 \text{ cm, } r = 7 \text{ cm.}$$

$$\text{So, } l = \sqrt{(7)^2 + (14)^2} = \sqrt{245} = 7\sqrt{5} \text{ cm.}$$

$$\therefore \text{ Total surface area} = \pi r l + \pi r^2$$

$$= \left(\frac{22}{7} \times 7 \times 7\sqrt{5} + \frac{22}{7} \times 7 \times 7 \right) \text{cm}^2$$

$$= [154(\sqrt{5} + 1)] \text{cm}^2$$

$$= (154 \times 3.236) \text{cm}^2$$

$$= 498.35 \text{ cm}^2.$$

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(5) In a division sum, the divisor is 10 times the quotient and 5 times the remainder. If the remainder is 46, what is the dividend ?

[A] 4236

[B] 4306

[C] 4336

[D] 5336

[E] None of these

Answer : [D]

Explanation:

$$\text{Divisor} = (5 \times 46) = 230$$

$$\therefore 10 \times \text{Quotient} = 230 \Rightarrow \frac{230}{10} = 23$$

$$\text{Dividend} = (\text{Divisor} \times \text{Quotient}) + \text{Remainder}$$

$$= (230 \times 23) + 46$$

$$= 5290 + 46$$

$$= 5336.$$

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(6) Which one of the following is the common factor of $(47^{43} + 43^{43})$ and $(47^{47} + 43^{47})$?

[A] $(47 - 43)$

[B] $(47 + 43)$

[C] $(47^{43} + 43^{43})$

[D] None of these

Answer : [B]

Explanation:

When n is odd, $(x^n + a^n)$ is always divisible by $(x + a)$.

\therefore Each one of $(47^{43} + 43^{43})$ and $(47^{47} + 43^{47})$ is divisible by $(47 + 43)$.

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(7) If the number $5 * 2$ is divisible by 6, then $*$ = ?

[A] 2

[B] 3

[C] 6

[D] 7

Answer : [A]

Explanation:

$6 = 3 \times 2$. Clearly, $5 * 2$ is divisible by 2. Replace $*$ by x .

Then, $(5 + x + 2)$ must be divisible by 3. So, $x = 2$.

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(8) The sum all even natural numbers between 1 and 31 is:

[A] 16

[B] 128

[C] 240

[D] 512

Answer : [C]

Explanation:

Required sum = $(2 + 4 + 6 + \dots + 30)$

This is an A.P. in which $a = 2$, $d = (4 - 2) = 2$ and $l = 30$.

Let the number of terms be n . Then,

$$t_n = 30 \Rightarrow a + (n - 1)d = 30$$

$$\Rightarrow 2 + (n - 1) \times 2 = 30$$

$$\Rightarrow n - 1 = 14$$

$$\Rightarrow n = 15$$

$$\therefore S_n = \frac{n}{2}(a + l) = \frac{15}{2} \times (2 + 30) = 240.$$

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(9) $35 + 15 \times 1.5 = ?$

[A] 85

[B] 51.5

[C] 57.5

[D] 5.25

[E] None of these

Answer : [C]

Explanation:

$$\text{Given Exp.} = 35 + 15 \times \frac{3}{2} = 35 + \frac{45}{2} = 35 + 22.5 = 57.5$$

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(10) $(1000)^9 \div 10^{24} = ?$

[A] 10000

[B] 1000

[C] 100

[D] 10

[E] None of these

Answer : [B]

Explanation:

$$\text{Given Exp.} = \frac{(1000)^9}{10^{24}} = \frac{(10^3)^9}{10^{24}} = \frac{(10)^{27}}{10^{24}} = 10^{(27-24)} = 10^3 = 1000$$

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(11) $\{(476 + 424)^2 - 4 \times 476 \times 424\} = ?$

[A] 2906

[B] 3116

[C] 2704

[D] 2904

[E] None of these

Answer : [C]

Explanation:

$$\text{Given Exp.} = [(a + b)^2 - 4ab], \text{ where } a = 476 \text{ and } b = 424$$

$$= [(476 + 424)^2 - 4 \times 476 \times 424]$$

$$= [(900)^2 - 807296]$$

$$= 810000 - 807296$$

$$= 2704.$$

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(12) There is 60% increase in an amount in 6 years at simple interest. What will be the compound interest of Rs. 12,000 after 3 years at the same rate?

[A] Rs. 2160

[B] Rs. 3120

[C] Rs. 3972

[D] Rs. 6240

[E] None of these

Answer : [C]

Explanation:

Let P = Rs. 100. Then, S.I. Rs. 60 and T = 6 years.

$$\therefore R = \left(\frac{100 \times 60}{100 \times 6} \right) = 10\% \text{ p.a.}$$

Now, P = Rs. 12000. T = 3 years and R = 10% p.a.

$$\begin{aligned} \therefore \text{C.I.} &= \text{Rs.} \left[12000 \times \left\{ \left(1 + \frac{10}{100} \right)^3 - 1 \right\} \right] \\ &= \text{Rs.} \left(12000 \times \frac{331}{1000} \right) \\ &= 3972. \end{aligned}$$

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(13) The least number of complete years in which a sum of money put out at 20% compound interest will be more than doubled is:

[A] 3

[B] 4

[C] 5

[D] 6

Answer : [B]

Explanation:

$$P \left(1 + \frac{20}{100} \right)^n > 2P \Rightarrow \left(\frac{6}{5} \right)^n > 2.$$

$$\text{Now, } \left(\frac{6}{5} \times \frac{6}{5} \times \frac{6}{5} \times \frac{6}{5} \right) > 2.$$

So, $n = 4$ years.

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(14) At what rate of compound interest per annum will a sum of Rs. 1200 become Rs. 1348.32 in 2 years?

[A] 6%

[B] 6.5%

[C] 7%

[D] 7.5%

Answer : [A]

Explanation:

Let the rate be R% p.a.

$$\text{Then, } 1200 \times \left(1 + \frac{R}{100} \right)^2 = 1348.32$$

$$\Rightarrow \left(1 + \frac{R}{100} \right)^2 = \frac{134832}{120000} = \frac{11236}{10000}$$

$$\therefore \left(1 + \frac{R}{100} \right)^2 = \left(\frac{106}{100} \right)^2$$

$$\Rightarrow 1 + \frac{R}{100} = \frac{106}{100}$$

