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CWC Superintendent (General) Aptitude Sample Paper

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(1) If log 27 = 1.431, then the value of log 9 is:

[A] 0.934

[B] 0.945

[C] 0.954

[D] 0.958

Answer : [C]

Explanation:
log 27 = 1.431
$\Rightarrow$ log (3^3) = 1.431
$\Rightarrow$ 3 log 3 = 1.431
$\Rightarrow$ log 3 = 0.477
$\therefore$ log 9 = log(3^2) = 2 log 3 = (2 x 0.477) = 0.954.

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(2)
If $\log_{10} 7 = a$, then $\log_{10}\left(\frac{1}{70}\right)$ is equal to:

[A] - (1 + a)

[B] $(1 + a)^{-1}$

[C]
$\frac{a}{10}$

[D]
$\frac{1}{10a}$

Answer : [A]

Explanation:
$\log_{10}\left(\frac{1}{70}\right)$ = $\log_{10} 1 - \log_{10} 70$

= - $\log_{10}$ (7 x 10)

= - ($\log_{10} 7 + \log_{10} 10$)

= - (a + 1).

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(3) If $\log_{10} 2 = 0.3010$, then $\log_2 10$ is equal to:

[A]
$\frac{699}{301}$

[B]
$\frac{1000}{301}$

[C] 0.3010

[D] 0.6990

Answer : [B]

Explanation:
$\log_2 10 = \frac{1}{\log_{10} 2} = \frac{1}{0.3010} = \frac{10000}{3010} = \frac{1000}{301}$.

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(4) If $\log_{10} 5 + \log_{10} (5x + 1) = \log_{10} (x + 5) + 1$, then x is equal to:

[A] 1

[B] 3

[C] 5

[D] 10

Answer : [B]

Explanation:
$\log_{10} 5 + \log_{10} (5x + 1) = \log_{10} (x + 5) + 1$
$\Rightarrow \log_{10} 5 + \log_{10} (5x + 1) = \log_{10} (x + 5) + \log_{10} 10$
$\Rightarrow \log_{10} [5 (5x + 1)] = \log_{10} [10(x + 5)]$
$\Rightarrow 5(5x + 1) = 10(x + 5)$
$\Rightarrow 5x + 1 = 2x + 10$
$\Rightarrow 3x = 9$
$\Rightarrow x = 3.$

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(5) The value of $\log_2 16$ is:

[A]
$\frac{1}{8}$

[B] 4

[C] 8

[D] 16

Answer : [B]

Explanation:
Let $\log_2 16 = n$.
Then, $2^n = 16 = 2^4 \quad \Rightarrow \quad n = 4.$
$\therefore \log_2 16 = 4.$

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(6) The ratio between the perimeter and the breadth of a rectangle is 5 : 1. If the area of the rectangle is 216 sq. cm, what is the length of the rectangle?

[A] 16 cm

[B] 18 cm

[C] 24 cm

[D] Data inadequate

[E] None of these

Answer : [B]

Explanation:
$\frac{2(l + b)}{b} = \frac{5}{1}$

$\Rightarrow 2l + 2b = 5b$
$\Rightarrow 3b = 2l$
$b = \frac{2}{3}l$

Then, Area = 216 cm^2
$\Rightarrow l \times b = 216$
$\Rightarrow l \times \frac{2}{3}l = 216$

$\Rightarrow l^2 = 324$
$\Rightarrow l = 18$ cm.

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(7) A rectangular park 60 m long and 40 m wide has two concrete crossroads running in the middle of the park and rest of the park has been used as a lawn. If the area of the lawn is 2109 sq. m, then what is the width of the road?

[A] 2.91 m

[B] 3 m

[C] 5.82 m

[D] None of these

Answer : [B]

Explanation:
Area of the park = (60 x 40) m^2 = 2400 m^2.
Area of the lawn = 2109 m^2.
$\therefore$ Area of the crossroads = (2400 - 2109) m^2 = 291 m^2.
Let the width of the road be x metres. Then,
$60x + 40x - x^2 = 291$
$\Rightarrow x^2 - 100x + 291 = 0$
$\Rightarrow (x - 97)(x - 3) = 0$
$\Rightarrow x = 3$.

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(8) A towel, when bleached, was found to have lost 20% of its length and 10% of its breadth. The percentage of decrease in area is:

[A] 10%

[B] 10.08%

[C] 20%

[D] 28%

Answer : [D]

Explanation:
Let original length = x and original breadth = y.

$$\text{Decrease in area} = xy - \left(\frac{80}{100}x \times \frac{90}{100}y\right)$$

$$= \left(xy - \frac{18}{25}xy\right)$$

$$= \frac{7}{25}xy.$$

$$\therefore \text{Decrease \%} = \left(\frac{7}{25}xy \times \frac{1}{xy} \times 100\right)\% = 28\%.$$

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(9) What is the least number of squares tiles required to pave the floor of a room 15 m 17 cm long and 9 m 2 cm broad?

[A] 814

[B] 820

[C] 840

[D] 844

Answer : [A]

Explanation:
Length of largest tile = H.C.F. of 1517 cm and 902 cm = 41 cm.
Area of each tile = (41 x 41) cm^2.

$$\therefore \text{Required number of tiles} = \left(\frac{1517 \times 902}{41 \times 41}\right) = 814.$$

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(10) The length of a rectangle is halved, while its breadth is tripled. What is the percentage change in area?

[A] 25% increase

[B] 50% increase

[C] 50% decrease

[D] 75% decrease

Answer : [B]

Explanation:
Let original length = x and original breadth = y.
Original area = xy.
New length = $\frac{x}{2}$.

New breadth = $3y$.
New area = $\left(\frac{x}{2} \times 3y\right) = \frac{3}{2}xy$.

$\therefore$ Increase % = $\left(\frac{1}{2}xy \times \frac{1}{xy} \times 100\right)_{\%} = 50\%$.

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(11) Given that $10^{0.48} = x$, $10^{0.70} = y$ and $x^z = y^2$, then the value of z is close to:

[A] 1.45

[B] 1.88

[C] 2.9

[D] 3.7

Answer : [C]

Explanation:
$x^z = y^2 \Leftrightarrow 10^{(0.48z)} = 10^{(2 \times 0.70)} = 10^{1.40}$
$\Rightarrow 0.48z = 1.40$
$\Rightarrow z = \frac{140}{48} = \frac{35}{12} = 2.9$ (approx.)

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(12) If $3^{(x - y)} = 27$ and $3^{(x + y)} = 243$, then x is equal to:

[A] 0

[B] 2

[C] 4

[D] 6

Answer : [C]

Explanation:
$3^{x - y} = 27 = 3^3 \Leftrightarrow x - y = 3$ ....(i)
$3^{x + y} = 243 = 3^5 \Leftrightarrow x + y = 5$ ....(ii)
On solving (i) and (ii), we get $x = 4$.

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(13)

$$\frac{1}{1 + x^{(b - a)} + x^{(c - a)}} + \frac{1}{1 + x^{(a - b)} + x^{(c - b)}} + \frac{1}{1 + x^{(b - c)} + x^{(a - c)}} = ?$$

[A] 0

[B] 1

[C] x^{a-b-c}

[D] None of these

Answer : [B]

Explanation:

$$\text{Given Exp.} = \frac{1}{\left(1 + \frac{x^b}{x^a} + \frac{x^c}{x^a}\right)} + \frac{1}{\left(1 + \frac{x^a}{x^b} + \frac{x^c}{x^b}\right)} + \frac{1}{\left(1 + \frac{x^b}{x^c} + \frac{x^a}{x^c}\right)}$$

$$= \frac{x^a}{(x^a + x^b + x^c)} + \frac{x^b}{(x^a + x^b + x^c)} + \frac{x^c}{(x^a + x^b + x^c)}$$

$$= \frac{(x^a + x^b + x^c)}{(x^a + x^b + x^c)}$$

= 1.

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(14) The value of $[(10)^{150} ? (10)^{146}]$

[A] 1000

[B] 10000

[C] 100000

[D] 10^6

Answer : [B]

Explanation:

$$(10)^{150} ? (10)^{146} = \frac{10^{150}}{10^{146}}$$

$= 10^{150 - 146}$
$= 10^4$
= 10000.

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(15) If m and n are whole numbers such that $m^n = 121$, the value of $(m - 1)^{n+1}$ is:

[A] 1

[B] 10

[C] 121

[D] 1000

Answer : [D]

Explanation:
We know that $11^2 = 121$.
Putting $m = 11$ and $n = 2$, we get:
$(m - 1)^{n+1} = (11 - 1)^{(2+1)} = 10^3 = 1000$.

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(16) Two trains running in opposite directions cross a man standing on the platform in 27 seconds and 17 seconds respectively and they cross each other in 23 seconds. The ratio of their speeds is:

[A] 1 : 3

[B] 3 : 2

[C] 3 : 4

[D] None of these

Answer : [B]

Explanation:
Let the speeds of the two trains be x m/sec and y m/sec respectively.
Then, length of the first train = $27x$ metres,
and length of the second train = $17y$ metres.
$\therefore \quad \frac{27x + 17y}{x + y} = 23$

$\Rightarrow 27x + 17y = 23x + 23y$
$\Rightarrow 4x = 6y$
$\Rightarrow \frac{x}{y} = \frac{3}{2}.$

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(17) Two goods train each 500 m long, are running in opposite directions on parallel tracks. Their speeds are 45 km/hr and 30 km/hr respectively. Find the time taken by the slower train to pass the driver of the faster one.

[A] 12 sec

[B] 24 sec

[C] 48 sec

[D] 60 sec

Answer : [B]

Explanation:
Relative speed = = (45 + 30) km/hr

$= \left(75 \times \frac{5}{18}\right)$ m/sec

$= \left(\frac{125}{6}\right)$ m/sec.

We have to find the time taken by the slower train to pass the DRIVER of the faster train and not the complete train.
So, distance covered = Length of the slower train.
Therefore, Distance covered = 500 m.
$\therefore$ Required time = $\left(500 \times \frac{6}{125}\right)$ = 24 sec.

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(18) Two trains are running in opposite directions with the same speed. If the length of each train is 120 metres and they cross each other in 12 seconds, then the speed of each train (in km/hr) is:

[A] 10

[B] 18

[C] 36

[D] 72

Answer : [C]

Explanation:
Let the speed of each train be x m/sec.
Then, relative speed of the two trains = $2x$ m/sec.
So, $2x = \frac{(120 + 120)}{12}$

$\Rightarrow 2x = 20$
$\Rightarrow x = 10.$
$\therefore$ Speed of each train = 10 m/sec = $\left(10 \times \frac{18}{5}\right)$ km/hr = 36 km/hr.

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(19) Two trains are running at 40 km/hr and 20 km/hr respectively in the same direction. Fast train completely passes a man sitting in the slower train in 5 seconds. What is the length of the fast train?

[A] 23 m

[B] $23\frac{2}{9}$ m

[C] $27\frac{7}{9}$ m

[D] 29 m

Answer : [C]

Explanation:

Relative speed = (40 - 20) km/hr = $\left(20 \times \frac{5}{18}\right)$ m/sec = $\left(\frac{50}{9}\right)$ m/sec.

$\therefore$ Length of faster train = $\left(\frac{50}{9} \times 5\right)$ m = $\frac{250}{9}$ m = $27\frac{7}{9}$ m.

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(20) Two, trains, one from Howrah to Patna and the other from Patna to Howrah, start simultaneously. After they meet, the trains reach their destinations after 9 hours and 16 hours respectively. The ratio of their speeds is:

[A] 2 : 3

[B] 4 : 3

[C] 6 : 7

[D] 9 : 16

Answer : [B]

Explanation:

Let us name the trains as A and B. Then,

(A's speed) : (B's speed) = b : a = 16 : 9 = 4 : 3.

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