Book For

Union Public Service Commission

UPSC

CDS AFA Aptitude Sample Paper

(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 2 = 0.3010 and log 3 = 0.4771, the value of $\log_5 512$ is:

[A] 2.870

[B] 2.967

[C] 3.876

[D] 3.912

Answer : [C]

Explanation:

$$\log_5 512 = \frac{\log 512}{\log 5}$$

$$= \frac{\log 2^9}{\log (10/2)}$$

$$= \frac{9 \log 2}{\log 10 - \log 2}$$

$$= \frac{(9 \times 0.3010)}{1 - 0.3010}$$

$$= \frac{2.709}{0.699}$$

$$= \frac{2709}{699}$$

$$= 3.876$$

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(3)

The value of $\left(\frac{1}{\log_3 60} + \frac{1}{\log_4 60} + \frac{1}{\log_5 60}\right)$ is:

[A] 0

[B] 1

[C] 5

[D] 60

Answer : [B]

Explanation:

Given expression $= \log_{60} 3 + \log_{60} 4 + \log_{60} 5$

$= \log_{60} (3 \times 4 \times 5)$

$= \log_{60} 60$

$= 1.$

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(4) If log 2 = 0.30103, the number of digits in 2^{64} is:

[A] 18

[B] 19

[C] 20

[D] 21

Answer : [C]

Explanation:

$\log (2^{64}) = 64 \times \log 2$

$= (64 \times 0.30103)$

$= 19.26592$

Its characteristic is 19.
Hence, then number of digits in 2^{64} is 20.

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(5) If $\log_x y = 100$ and $\log_2 x = 10$, then the value of y is:

[A] 2^{10}

[B] 2^{100}

[C] 2^{1000}

[D] 2^{10000}

Answer : [C]

Explanation:

$\log_2 x = 10 \Rightarrow x = 2^{10}$.

$\therefore \log_x y = 100$

$\Rightarrow y = x^{100}$

$\Rightarrow y = (2^{10})^{100}$ [put value of x]

$\Rightarrow y = 2^{1000}$.

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(6) A can lay railway track between two given stations in 16 days and B can do the same job in 12 days. With help of C, they did the job in 4 days only. Then, C alone can do the job in:

[A]

$9\frac{1}{5}$ days

[B]

$9\frac{2}{5}$ days

[C]

$9\frac{3}{5}$ days

[D] 10

Answer : [C]

Explanation:

(A + B + C)'s 1 day's work = $\frac{1}{4}$,

A's 1 day's work = $\frac{1}{16}$,

B's 1 day's work = $\frac{1}{12}$.

$\therefore$ C's 1 day's work = $\frac{1}{4} - \left(\frac{1}{16} + \frac{1}{12}\right) = \left(\frac{1}{4} - \frac{7}{48}\right) = \frac{5}{48}$.

So, C alone can do the work in $\frac{48}{5} = 9\frac{3}{5}$ days.

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(7) A and B can together finish a work 30 days. They worked together for 20 days and then B left. After another 20 days, A finished the remaining work. In how many days A alone can finish the work?

[A] 40

[B] 50

[C] 54

[D] 60

Answer : [D]

Explanation:

(A + B)'s 20 day's work = $\left(\frac{1}{30} \times 20\right) = \frac{2}{3}$.

Remaining work = $\left(1 - \frac{2}{3}\right) = \frac{1}{3}$.

Now, $\frac{1}{3}$ work is done by A in 20 days.

Therefore, the whole work will be done by A in (20 x 3) = 60 days.

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(8) A, B and C can complete a piece of work in 24, 6 and 12 days respectively. Working together, they will complete the same work in:

[A]

$\frac{1}{}$ day

24

[B]
$\frac{7}{24}$ day

[C]
$3\frac{3}{7}$ days

[D] 4 days

Answer : [C]

Explanation:

Formula: If A can do a piece of work in n days, then A's 1 day's work = $\frac{1}{n}$.

(A + B + C)'s 1 day's work = $\left(\frac{1}{24} + \frac{1}{6} + \frac{1}{12}\right) = \frac{7}{24}$.

So, all the three together will complete the job in $\left(\frac{24}{7}\right)$ days = $3\frac{3}{7}$ days.

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(9) A and B can complete a work in 15 days and 10 days respectively. They started doing the work together but after 2 days B had to leave and A alone completed the remaining work. The whole work was completed in :

[A] 8 days

[B] 10 days

[C] 12 days

[D] 15 days

Answer : [C]

Explanation:

(A + B)'s 1 day's work = $\left(\frac{1}{15} + \frac{1}{10}\right) = \frac{1}{6}$.

Work done by A and B in 2 days = $\left(\frac{1}{6} \times 2\right) = \frac{1}{3}$.

Remaining work = $\left(1 - \frac{1}{3}\right) = \frac{2}{3}$.

Now, $\frac{1}{15}$ work is done by A in 1 day.

$\therefore$ $\frac{2}{3}$ work will be done by a in $\left(15 \times \frac{2}{3}\right)$ = 10 days.

Hence, the total time taken = (10 + 2) = 12 days.

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(10) A and B can do a work in 8 days, B and C can do the same work in 12 days. A, B and C together can finish it in 6 days. A and C together will do it in :

[A] 4 days

[B] 6 days

[C] 8 days

[D] 12 days

Answer : [C]

Explanation:

(A + B + C)'s 1 day's work = $\frac{1}{6}$;

(A + B)'s 1 day's work = $\frac{1}{8}$;

(B + C)'s 1 day's work = $\frac{1}{12}$.

$\therefore$ (A + C)'s 1 day's work = $\left(2 \times \frac{1}{6}\right) - \left(\frac{1}{8} + \frac{1}{12}\right)$

$= \left(\frac{1}{3} - \frac{5}{24}\right)$

$= \frac{3}{24}$

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

So, A and C together will do the work in 8 days.

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(11) In a certain store, the profit is 320% of the cost. If the cost increases by 25% but the selling price remains constant, approximately what percentage of the selling price is the profit?

[A] 30%

[B] 70%

[C] 100%

[D] 250%

Answer : [B]

Explanation:
Let C.P.= Rs. 100. Then, Profit = Rs. 320, S.P. = Rs. 420.
New C.P. = 125% of Rs. 100 = Rs. 125
New S.P. = Rs. 420.
Profit = Rs. (420 - 125) = Rs. 295.
$\therefore$ Required percentage = $\left(\frac{295}{420} \times 100\right)_{\%}$ = $\frac{1475}{21}$% = 70% (approximately).

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(12) Alfred buys an old scooter for Rs. 4700 and spends Rs. 800 on its repairs. If he sells the scooter for Rs. 5800, his gain percent is:

[A]
$4\frac{4}{7}$%

[B]
$5\frac{5}{11}$%

[C] 10%

[D] 12%

Answer : [B]

Explanation:
Cost Price (C.P.) = Rs. (4700 + 800) = Rs. 5500.

Selling Price (S.P.) = Rs. 5800.
Gain = (S.P.) - (C.P.) = Rs.(5800 - 5500) = Rs. 300.
Gain % = $\left(\frac{300}{5500} \times 100\right)\%$ = $5\frac{5}{11}\%$

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(13) A shopkeeper expects a gain of 22.5% on his cost price. If in a week, his sale was of Rs. 392, what was his profit?

[A] Rs. 18.20

[B] Rs. 70

[C] Rs. 72

[D] Rs. 88.25

Answer : [C]

Explanation:
C.P. = Rs. $\left(\frac{100}{122.5} \times 392\right)$ = Rs. $\left(\frac{1000}{1225} \times 392\right)$ = Rs. 320

$\therefore$ Profit = Rs. (392 - 320) = Rs. 72.

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(14) A man buys a cycle for Rs. 1400 and sells it at a loss of 15%. What is the selling price of the cycle?

[A] Rs. 1090

[B] Rs. 1160

[C] Rs. 1190

[D] Rs. 1202

Answer : [C]

Explanation:
S.P. = 85% of Rs. 1400 = Rs. $\left(\frac{85}{100} \times 1400\right)$ = Rs. 1190

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(15) A shopkeeper sells one transistor for Rs. 840 at a gain of 20% and another for Rs. 960 at a loss of 4%. His total gain or loss percent is:

[A]
$5\frac{15}{17}\%$ loss

[B]
$5\frac{15}{17}\%$ gain

[C]
$6\frac{2}{3}\%$ gain

[D] None of these

Answer : [B]

Explanation:
C.P. of 1^{st} transistor = Rs. $\left(\frac{100}{120} \times 840\right)$ = Rs. 700.

100

C.P. of 2nd transistor = Rs. $\left(\frac{}{96} \times 960\right)$ = Rs. 1000

So, total C.P. = Rs. (700 + 1000) = Rs. 1700.
Total S.P. = Rs. (840 + 960) = Rs. 1800.
$\therefore$ Gain % = $\left(\frac{100}{1700} \times 100\right)_{\%} = 5\frac{15}{17}\%$

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(16) What is the difference between the compound interests on Rs. 5000 for $1\frac{1}{2}$ years at 4% per annum compounded yearly and half-yearly?

[A] Rs. 2.04

[B] Rs. 3.06

[C] Rs. 4.80

[D] Rs. 8.30

Answer : [A]

Explanation:

C.I. when interest compounded yearly $= \text{Rs.} \left[5000 \times \left(1 + \frac{4}{100}\right) \times \left(1 + \frac{\frac{1}{2} \times 4}{100}\right)\right]$

$= \text{Rs.} \left(5000 \times \frac{26}{25} \times \frac{51}{50}\right)$

$= \text{Rs. } 5304.$

C.I. when interest is compounded half-yearly $= \text{Rs.} \left[5000 \times \left(1 + \frac{2}{100}\right)^3\right]$

$= \text{Rs.} \left(5000 \times \frac{51}{50} \times \frac{51}{50} \times \frac{51}{50}\right)$

$= \text{Rs. } 5306.04$

$\therefore$ Difference = Rs. (5306.04 - 5304) = Rs. 2.04

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(17) A bank offers 5% compound interest calculated on half-yearly basis. A customer deposits Rs. 1600 each on 1st January and 1st July of a year. At the end of the year, the amount he would have gained by way of interest is:

[A] Rs. 120

[B] Rs. 121

[C] Rs. 122

[D] Rs. 123

Answer : [B]

Explanation:

Amount $= \text{Rs.} \left[1600 \times \left(1 + \frac{5}{2 \times 100}\right)^2 + 1600 \times \left(1 + \frac{5}{2 \times 100}\right)\right]$

$= \text{Rs.} \left[1600 \times \frac{41}{40} \times \frac{41}{40} + 1600 \times \frac{41}{40}\right]$

$= \text{Rs.} \left[1600 \times \frac{41}{40}\left(\frac{41}{40} + 1\right)\right]$

$= \text{Rs.} \left[\frac{1600 \times 41 \times 81}{40 \times 40}\right]$

$= \text{Rs. } 3321.$

$\therefore$ C.I. = Rs. (3321 - 3200) = Rs. 121

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(18) The effective annual rate of interest corresponding to a nominal rate of 6% per annum payable half-yearly is:

[A] 6.06%

[B] 6.07%

[C] 6.08%

[D] 6.09%

Answer : [D]

Explanation:

Amount of Rs. 100 for 1 year when compounded half-yearly $= \text{Rs.} \left[100 \times \left(1 + \frac{3}{100}\right)^2\right] = \text{Rs. } 106.09$

$\therefore$ Effective rate = (106.09 - 100)% = 6.09%

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(19) What will be the compound interest on a sum of Rs. 25,000 after 3 years at the rate of 12 p.c.p.a.?

[A] Rs. 9000.30

[B] Rs. 9720

[C] Rs. 10123.20

[D] Rs. 10483.20

[E] None of these

Answer : [C]

Explanation:

Amount $= \text{Rs.} \left[25000 \times \left(1 + \frac{12}{100}\right)^3\right]$

$= \text{Rs.} \left(25000 \times \frac{28}{25} \times \frac{28}{25} \times \frac{28}{25}\right)$

$= \text{Rs. } 35123.20$

$\therefore$ C.I. = Rs. (35123.20 - 25000) = Rs. 10123.20

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(20) If the simple interest on a sum of money for 2 years at 5% per annum is Rs. 50, what is the compound interest on the same at the same rate and for the same time?

[A] Rs. 51.25

[B] Rs. 52

[C] Rs. 54.25

[D] Rs. 60

Answer : [A]

Explanation:

Sum = Rs. $\left(\frac{50 \times 100}{2 \times 5}\right)$ = Rs. 500.

Amount = Rs. $\left[500 \times \left(1 + \frac{5}{100}\right)^2\right]$

= Rs. $\left(500 \times \frac{21}{20} \times \frac{21}{20}\right)$

= Rs. 551.25

$\therefore$ C.I. = Rs. (551.25 - 500) = Rs. 51.25
