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Kendriya Vidyalaya Sangathan

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(1) The banker's discount on a sum of money for $1\frac{1}{2}$ years is Rs. 558 and the true discount on the same sum for 2 years is Rs. 600. The rate percent is:

[A] 10%

[B] 13%

[C] 12%

[D] 15%

Answer : [C]

Explanation:

B.D. for $\frac{3}{2}$ years = Rs. 558.

B.D. for 2 years = Rs. $\left(558 \times \frac{2}{3} \times 2\right)$

= Rs. 744

T.D. for 2 years = Rs. 600.

$\therefore$ Sum = $\frac{\text{B.D. x T.D.}}{\text{B.D. - T.D}}$ = Rs. $\left(\frac{744 \times 600}{144}\right)$ = Rs. 3100.

Thus, Rs. 744 is S.I. on Rs. 3100 for 2 years.

$\therefore$ Rate = $\left(\frac{100 \times 744}{3100 \times 2}\right)\%$ = 12%

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(2) The present worth of a certain bill due sometime hence is Rs. 800 and the true discount is Rs. 36. The banker's discount is:

[A] Rs. 37

[B] Rs. 37.62

[C] Rs. 34.38

[D] Rs. 38.98

Answer : [B]

Explanation:

B.G. = $\frac{(\text{T.D.})^2}{\text{P.W.}}$ = Rs. $\left(\frac{36 \times 36}{800}\right)$ = Rs. 1.62

$\therefore$ B.D. = (T.D. + B.G.) = Rs. (36 + 1.62) = Rs. 37.62

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(3) The certain worth of a certain sum due sometime hence is Rs. 1600 and the true discount is Rs. 160. The banker's gain is:

[A] Rs. 20

[B] Rs. 24

[C] Rs. 16

[D] Rs. 12

Answer : [C]

Explanation:

B.G. = $\frac{(\text{T.D.})^2}{\text{P.W.}}$ = Rs. $\left(\frac{160 \times 160}{1600}\right)$ = Rs. 16.

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(4) A is thrice as good as workman as B and therefore is able to finish a job in 60 days less than B. Working together, they can do it in:

[A] 20 days

[B]
$22\frac{1}{2}$ days

[C] 25 days

[D] 30 days

Answer : [B]

Explanation:
Ratio of times taken by A and B = 1 : 3.
The time difference is (3 - 1) 2 days while B take 3 days and A takes 1 day.
If difference of time is 2 days, B takes 3 days.
If difference of time is 60 days, B takes $\left(\frac{3}{2} \times 60\right)$ = 90 days.

So, A takes 30 days to do the work.
A's 1 day's work = $\frac{1}{30}$

B's 1 day's work = $\frac{1}{90}$

(A + B)'s 1 day's work = $\left(\frac{1}{30} + \frac{1}{90}\right) = \frac{4}{90} = \frac{2}{45}$

$\therefore$ A and B together can do the work in $\frac{45}{2} = 22\frac{1}{2}$ days.

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(5) A can do a work in 15 days and B in 20 days. If they work on it together for 4 days, then the fraction of the work that is left is :

[A]

$\frac{1}{4}$

[B]

$\frac{1}{10}$

[C]

$\frac{7}{15}$

[D]

$\frac{8}{15}$

Answer : [D]

Explanation:
A's 1 day's work = $\frac{1}{15}$;

B's 1 day's work = $\frac{1}{20}$;

(A + B)'s 1 day's work = $\left(\frac{1}{15} + \frac{1}{20}\right) = \frac{7}{60}$.

(A + B)'s 4 day's work = $\left(\frac{7}{60} \times 4\right) = \frac{7}{15}$.

Therefore, Remaining work = $\left(1 - \frac{7}{15}\right) = \frac{8}{15}$.

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(6) A can do a piece of work in 4 hours; B and C together can do it in 3 hours, while A and C together can do it in 2 hours. How long will B alone take to do it?

[A] 8 hours

[B] 10 hours

[C] 12 hours

[D] 24 hours

Answer : [C]

Explanation:

A's 1 hour's work = $\frac{1}{4}$;

(B + C)'s 1 hour's work = $\frac{1}{3}$;

(A + C)'s 1 hour's work = $\frac{1}{2}$.

(A + B + C)'s 1 hour's work = $\left(\frac{1}{4} + \frac{1}{3}\right) = \frac{7}{12}$.

B's 1 hour's work = $\left(\frac{7}{12} - \frac{1}{2}\right) = \frac{1}{12}$.

∴ B alone will take 12 hours to do the work.

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(7) If 6 men and 8 boys can do a piece of work in 10 days while 26 men and 48 boys can do the same in 2 days, the time taken by 15 men and 20 boys in doing the same type of work will be:

[A] 4 days

[B] 5 days

[C] 6 days

[D] 7 days

Answer : [A]

Explanation:

Let 1 man's 1 day's work = x and 1 boy's 1 day's work = y.

Then, $6x + 8y = \frac{1}{10}$ and $26x + 48y = \frac{1}{2}$.

Solving these two equations, we get : $x = \frac{1}{100}$ and $y = \frac{1}{200}$.

(15 men + 20 boy)'s 1 day's work = $\left(\frac{15}{100} + \frac{20}{200}\right) = \frac{1}{4}$.

∴ 15 men and 20 boys can do the work in 4 days.

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(8) 10 women can complete a work in 7 days and 10 children take 14 days to complete the work. How many days will 5 women and 10 children take to complete the work?

[A] 3

[B] 5

[C] 7

[D] Cannot be determined

[E] None of these

Answer : [C]

Explanation:

1 woman's 1 day's work = $\frac{1}{70}$

1 child's 1 day's work = $\frac{1}{140}$

(5 women + 10 children)'s day's work = $\left(\frac{5}{70} + \frac{10}{140}\right) = \left(\frac{1}{14} + \frac{1}{14}\right) = \frac{1}{7}$

$\therefore$ 5 women and 10 children will complete the work in 7 days.

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(9) P can complete a work in 12 days working 8 hours a day. Q can complete the same work in 8 days working 10 hours a day. If both P and Q work together, working 8 hours a day, in how many days can they complete the work?

[A] $5\frac{5}{11}$

[B] $5\frac{6}{11}$

[C] $6\frac{5}{11}$

[D] $6\frac{6}{11}$

Answer : [A]

Explanation:
P can complete the work in (12 x 8) hrs. = 96 hrs.
Q can complete the work in (8 x 10) hrs. = 80 hrs.
$\therefore$ P's1 hour's work = $\frac{1}{96}$ and Q's 1 hour's work = $\frac{1}{80}$.

(P + Q)'s 1 hour's work = $\left(\frac{1}{96} + \frac{1}{80}\right) = \frac{11}{480}$.

So, both P and Q will finish the work in $\left(\frac{480}{11}\right)$ hrs.

$\therefore$ Number of days of 8 hours each = $\left(\frac{480}{11} \times \frac{1}{8}\right) = \frac{60}{11}$ days = $5\frac{5}{11}$ days.

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(10) Sakshi can do a piece of work in 20 days. Tanya is 25% more efficient than Sakshi. The number of days taken by Tanya to do the same piece of work is:

[A] 15

[B] 16

[C] 18

[D] 25

Answer : [B]

Explanation:
Ratio of times taken by Sakshi and Tanya = 125 : 100 = 5 : 4.
Suppose Tanya takes x days to do the work.
5 : 4 :: 20 : x $\Rightarrow x = \left(\frac{4 \times 20}{5}\right)$

$\Rightarrow x$ = 16 days.
Hence, Tanya takes 16 days to complete the work.

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(11) Ravi and Kumar are working on an assignment. Ravi takes 6 hours to type 32 pages on a computer, while Kumar takes 5 hours to type 40 pages. How much time will they take, working together on two different computers to type an assignment of 110 pages?

[A] 7 hours 30 minutes

[B] 8 hours

[C] 8 hours 15 minutes

[D] 8 hours 25 minutes

Answer : [C]

Explanation:

Number of pages typed by Ravi in 1 hour = $\frac{32}{6} = \frac{16}{3}$.

Number of pages typed by Kumar in 1 hour = $\frac{40}{5} = 8$.

Number of pages typed by both in 1 hour = $\left(\frac{16}{3} + 8\right) = \frac{40}{3}$.

$\therefore$ Time taken by both to type 110 pages = $\left(110 \times \frac{3}{40}\right)$ hours

$= 8\frac{1}{4}$ hours (or) 8 hours 15 minutes.

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(12) A and B can do a piece of work in 30 days, while B and C can do the same work in 24 days and C and A in 20 days. They all work together for 10 days when B and C leave. How many days more will A take to finish the work?

[A] 18 days

[B] 24 days

[C] 30 days

[D] 36 days

Answer : [A]

Explanation:

2(A + B + C)'s 1 day's work = $\left(\frac{1}{30} + \frac{1}{24} + \frac{1}{20}\right) = \frac{15}{120} = \frac{1}{8}$.

Therefore, (A + B + C)'s 1 day's work = $\frac{1}{2 \times 8} = \frac{1}{16}$.

Work done by A, B, C in 10 days = $\frac{10}{16} = \frac{5}{8}$.

Remaining work = $\left(1 - \frac{5}{8}\right) = \frac{3}{8}$.

A's 1 day's work = $\left(\frac{1}{16} - \frac{1}{24}\right) = \frac{1}{48}$.

Now, $\frac{1}{48}$ work is done by A in 1 day.

So, $\frac{3}{8}$ work will be done by A in $\left(48 \times \frac{3}{8}\right)$ = 18 days.

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(13) Twenty women can do a work in sixteen days. Sixteen men can complete the same work in fifteen days. What is the ratio between the capacity of a man and a woman?

[A] 3 : 4

[B] 4 : 3

[C] 5 : 3

[D] Data inadequate

Answer : [B]

Explanation:

(20 x 16) women can complete the work in 1 day.

$\therefore$ 1 woman's 1 day's work = $\frac{}{320}$.

(16 x 15) men can complete the work in 1 day.

$\therefore$ 1 man's 1 day's work = $\frac{1}{240}$

So, required ratio = $\frac{1}{240} : \frac{1}{320}$

$= \frac{1}{3} : \frac{1}{4}$

= 4 : 3 (cross multiplied)

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(14) X can do a piece of work in 40 days. He works at it for 8 days and then Y finished it in 16 days. How long will they together take to complete the work?

[A]

$13\frac{1}{3}$ days

[B] 15 days

[C] 20 days

[D] 26 days

Answer : [A]

Explanation:

Work done by X in 8 days = $\left(\frac{1}{40} \text{ x } 8\right) = \frac{1}{5}$.

Remaining work = $\left(1 - \frac{1}{5}\right) = \frac{4}{5}$.

Now, $\frac{4}{5}$ work is done by Y in 16 days.

Whole work will be done by Y in $\left(16 \text{ x } \frac{5}{4}\right)$ = 20 days.

$\therefore$ X's 1 day's work = $\frac{1}{40}$, Y's 1 day's work = $\frac{1}{20}$.

(X + Y)'s 1 day's work = $\left(\frac{1}{40} + \frac{1}{20}\right) = \frac{3}{40}$.

Hence, X and Y will together complete the work in $\left(\frac{40}{3}\right) = 13\frac{1}{3}$ days.

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

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

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

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

= Rs. 3321.

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

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(17) 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 = Rs. $\left[100 \times \left(1 + \frac{3}{100}\right)^2\right]$ = Rs. 106.09

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

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(18) 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.

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

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

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

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

$\Rightarrow R = 6\%$

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(19) The compound interest on a certain sum for 2 years at 10% per annum is Rs. 525. The simple interest on the same sum for double the time at half the rate percent per annum is:

[A] Rs. 400

[B] Rs. 500

[C] Rs. 600

[D] Rs. 800

Answer : [B]

Explanation:
Let the sum be Rs. P.

Then, $\left[P\left(1 + \frac{10}{100}\right)^2 - P\right] = 525$

$\Rightarrow P\left[\left(\frac{11}{10}\right)^2 - 1\right] = 525$

$\Rightarrow P = \left(\frac{525 \times 100}{21}\right) = 2500.$

$\therefore$ Sum = Rs . 2500.

So, S.I. = Rs. $\left(\frac{2500 \times 5 \times 4}{100}\right)$ = Rs. 500

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(20) The difference between compound interest and simple interest on an amount of Rs. 15,000 for 2 years is Rs. 96. What is the rate of interest per annum?

[A] 8

[B] 10

[C] 12

[D] Cannot be determined

[E] None of these

Answer : [A]

Explanation:

$\left[15000 \times \left(1 + \frac{R}{100}\right)^2 - 15000\right] - \left(\frac{15000 \times R \times 2}{100}\right) = 96$

$\Rightarrow 15000 \quad 1 + \quad ^{R} \quad ^{2} - 1 - \quad ^{2R} \quad = 96$

$$\left[\left(\quad\frac{\quad}{100}\right)\qquad\frac{\quad}{100}\right]$$

$$\Rightarrow 15000\left[\frac{(100+R)^2-10000-(200\times R)}{10000}\right]=96$$

$$\Rightarrow R^2=\left(\frac{96\times 2}{3}\right)=64$$

$\Rightarrow$ R = 8.
$\therefore$ Rate = 8%.
