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**(1) The banker's gain of a certain sum due 2 years hence at 10% per annum is Rs. 24. The present worth is:**

[A] Rs. 480

[B] Rs. 520

[C] Rs. 600

[D] Rs. 960

**Answer : [C]**

**Explanation:**

$$\text{T.D.} = \left(\frac{\text{B.G. x 100}}{\text{Rate x Time}}\right) = \text{Rs.} \left(\frac{24 \times 100}{10 \times 2}\right) = \text{Rs. 120.}$$

$$\therefore \quad \text{P.W.} = \frac{100 \times \text{T.D.}}{\text{Rate x Time}} = \text{Rs.} \left(\frac{100 \times 120}{10 \times 2}\right) = \text{Rs. 600.}$$

**(2) 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.

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

$$= \text{Rs. 744}$$

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

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

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

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

**(3) The banker's discount on Rs. 1600 at 15% per annum is the same as true discount on Rs. 1680 for the same time and at the same rate. The time is:**

[A] 3 months

[B] 4 months

[C] 6 months

[D] 8 months

**Answer : [B]**

**Explanation:**

S.I. on Rs. 1600 = T.D. on Rs. 1680.

$\therefore$ Rs. 1600 is the P.W. of Rs. 1680, *i.e.,* Rs. 80 is on Rs. 1600 at 15%.

$$\therefore \quad \text{Time} = \left(\frac{100 \times 80}{1600 \times 15}\right)_{\text{year}} = \frac{1}{3} \text{ year = 4 months.}$$

**(4)**

If $\log \dfrac{a}{b} + \log \dfrac{b}{a} = \log (a + b)$, then:

[A] $a + b = 1$

[B] $a - b = 1$

[C] $a = b$

[D] $a^2 - b^2 = 1$

**Answer : [A]**

**Explanation:**

$\log \dfrac{a}{b} + \log \dfrac{b}{a} = \log (a + b)$

$\Rightarrow \log (a + b) = \log\left(\dfrac{a}{b} \times \dfrac{b}{a}\right) = \log 1.$

So, $a + b = 1$.

**(5)**

$\dfrac{\log \sqrt{8}}{\log 8}$ is equal to:

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

[B]
$\dfrac{1}{4}$

[C]
$\dfrac{1}{2}$

[D]
$\dfrac{1}{8}$

**Answer : [C]**

**Explanation:**

$\dfrac{\log \sqrt{8}}{\log 8} = \dfrac{\log (8)^{1/2}}{\log 8} = \dfrac{\frac{1}{2}\log 8}{\log 8} = \dfrac{1}{2}.$

**(6) 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:**
$\log 27 = 1.431$
$\Rightarrow \log (3^3) = 1.431$
$\Rightarrow 3 \log 3 = 1.431$
$\Rightarrow \log 3 = 0.477$
$\therefore \log 9 = \log(3^2) = 2 \log 3 = (2 \times 0.477) = 0.954.$

**(7) Which of the following statements is not correct?**

[A] $\log_{10} 10 = 1$

[B] $\log (2 + 3) = \log (2 \times 3)$

[C] $\log_{10} 1 = 0$

[D] $\log (1 + 2 + 3) = \log 1 + \log 2 + \log 3$

**Answer : [B]**

**Explanation:**
(a) Since $\log_a a = 1$, so $\log_{10} 10 = 1$.
(b) $\log (2 + 3) = \log 5$ and $\log (2 \times 3) = \log 6 = \log 2 + \log 3$
   $\therefore$ $\log (2 + 3) \neq \log (2 \times 3)$
(c) Since $\log_a 1 = 0$, so $\log_{10} 1 = 0$.
(d) $\log (1 + 2 + 3) = \log 6 = \log (1 \times 2 \times 3) = \log 1 + \log 2 + \log 3$.
So, (b) is incorrect.

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**(8) 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:**

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

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

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

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

$= \dfrac{2.709}{0.699}$

$= \dfrac{2709}{699}$

$= 3.876$

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**(9) A, B and C can do a piece of work in 20, 30 and 60 days respectively. In how many days can A do the work if he is assisted by B and C on every third day?**

[A] 12 days

[B] 15 days

[C] 16 days

[D] 18 days

**Answer : [B]**

**Explanation:**

A's 2 day's work $= \left(\dfrac{1}{20} \times 2\right) = \dfrac{1}{10}$.

(A + B + C)'s 1 day's work $= \left(\dfrac{1}{20} + \dfrac{1}{30} + \dfrac{1}{60}\right) = \dfrac{6}{60} = \dfrac{1}{10}$.

Work done in 3 days $= \left(\dfrac{1}{10} + \dfrac{1}{10}\right) = \dfrac{1}{5}$.

Now, $\frac{1}{5}$ work is done in 3 days.

∵ Whole work will be done in (3 x 5) = 15 days.

**(10) 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 = $\left(\frac{1}{30} + \frac{1}{90}\right) = \frac{4}{90} = \frac{2}{45}$

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

**(11) A alone can do a piece of work in 6 days and B alone in 8 days. A and B undertook to do it for Rs. 3200. With the help of C, they completed the work in 3 days. How much is to be paid to C?**

[A] Rs. 375

[B] Rs. 400

[C] Rs. 600

[D] Rs. 800

**Answer : [B]**

**Explanation:**
C's 1 day's work = $\frac{1}{3} - \left(\frac{1}{6} + \frac{1}{8}\right) = \frac{1}{3} - \frac{7}{24} = \frac{1}{24}$.

A's wages : B's wages : C's wages = $\frac{1}{6} : \frac{1}{8} : \frac{1}{24}$ = 4 : 3 : 1.

∵ C's share (for 3 days) = Rs. $\left(3 \times \frac{1}{24} \times 3200\right)$ = Rs. 400.

**(12) 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 = $\left( 1 - \frac{7}{15} \right) = \frac{8}{15}$.

**(13) 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 = $\frac{1}{12}$ .

∴ 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.

**(14) A can do a certain work in the same time in which B and C together can do it. If A and B together could do it in 10 days and C alone in 50 days, then B alone could do it in:**

[A] 15 days

[B] 20 days

[C] 25 days

[D] 30 days

**Answer : [C]**

**Explanation:**

(A + B)'s 1 day's work = $\dfrac{1}{10}$

C's 1 day's work = $\dfrac{1}{50}$

(A + B + C)'s 1 day's work = $\left(\dfrac{1}{10} + \dfrac{1}{50}\right) = \dfrac{6}{50} = \dfrac{3}{25}$. .... (i)

A's 1 day's work = (B + C)'s 1 day's work .... (ii)

From (i) and (ii), we get: 2 x (A's 1 day's work) = $\dfrac{3}{25}$

$\Rightarrow$ A's 1 day's work = $\dfrac{3}{50}$.

$\therefore$ B's 1 day's work $\left(\dfrac{1}{10} - \dfrac{3}{50}\right) = \dfrac{2}{50} = \dfrac{1}{25}$.

So, B alone could do the work in 25 days.

**(15) 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 = $\dfrac{1}{4}$ ;

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

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

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

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

$\therefore$ B alone will take 12 hours to do the work.

**(16) In order to obtain an income of Rs. 650 from 10% stock at Rs. 96, one must make an investment of:**

[A] Rs. 3100

[B] Rs. 6240

[C] Rs. 6500

[D] Rs. 9600

**Answer : [B]**

**Explanation:**
To obtain Rs. 10, investment = Rs. 96.

To obtain Rs. 650, investment = Rs. $\left( \dfrac{96}{10} \times 650 \right)$ = Rs. 6240.

**(17) A man bought 20 shares of Rs. 50 at 5 discount, the rate of dividend being $13\frac{1}{2}$. The rate of interest obtained is:**

[A] $12\frac{1}{2}$%

[B] $13\frac{1}{2}$%

[C] 15%

[D] $16\frac{2}{3}$%

**Answer : [C]**

**Explanation:**
Investment = Rs. [20 x (50 - 5)] = Rs. 900.
Face value = Rs. (50 x 20) = Rs. 1000.

Dividend = Rs. $\left( \dfrac{27}{2} \times \dfrac{1000}{100} \right)$ = Rs. 135.

Interest obtained = $\left( \dfrac{135}{900} \times 100 \right)$% = 15%

**(18) By investing in $16\frac{2}{3}$% stock at 64, one earns Rs. 1500. The investment made is:**

[A] Rs. 5640

[B] Rs. 5760

[C] Rs. 7500

[D] Rs. 9600

**Answer : [B]**

**Explanation:**
To earn Rs. $\dfrac{50}{3}$, investment = Rs. 64.

To earn Rs. 1500, investment = Rs. $\left( 64 \times \dfrac{3}{50} \times 1500 \right)$ = Rs. 5760.

**(19) A man buys Rs. 20 shares paying 9% dividend. The man wants to have an interest of 12% on his money. The market value of each share is:**

[A] Rs. 12

[B] Rs. 15

[C] Rs. 18

[D] Rs. 21

**Answer : [B]**

**Explanation:**
Dividend on Rs. 20 = Rs. $\left( \dfrac{9}{100} \times 20 \right)$ = Rs. $\dfrac{9}{5}$.

Rs. 12 is an income on Rs. 100.

$\therefore$ Rs. $\frac{9}{5}$ is an income on Rs. $\left(\frac{100}{12} \times \frac{9}{5}\right)$ = Rs. 15.

**(20) Which is better investment: 11% stock at 143  or  $9\frac{3}{4}$% stock at 117?**

[A] 11% stock at 143

[B]
$9\frac{3}{4}$% stock at 117

[C] Both are equally good

[D] Cannot be compared, as the total amount of investment is not given.

**Answer : [B]**

**Explanation:**
Let investment in each case be Rs. (143 x 117).

Income in 1$^{st}$ case = Rs. $\left(\frac{11}{143} \times 143 \times 117\right)$ = Rs. 1287.

Income in 2$^{nd}$ case = Rs. $\left(\frac{39}{4 \times 117} \times 143 \times 117\right)$ = Rs. 1394.25

Clearly, $9\frac{3}{4}$% stock at 117 is better.