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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:**

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

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

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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:**

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

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

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(3)

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

[A]  $a + b = 1$

[B]  $a - b = 1$

[C]  $a = b$

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

**Answer : [A]**

**Explanation:**

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

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

So,  $a + b = 1$ .

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(4)

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:**

$$\begin{aligned}\text{Given expression} &= \log_{60} 3 + \log_{60} 4 + \log_{60} 5 \\ &= \log_{60} (3 \times 4 \times 5) \\ &= \log_{60} 60 \\ &= 1.\end{aligned}$$

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**(5) A works twice as fast as B. If B can complete a work in 12 days independently, the number of days in which A and B can together finish the work in :**

[A] 4 days

[B] 6 days

[C] 8 days

[D] 18 days

**Answer : [A]**

**Explanation:**

Ratio of rates of working of A and B = 2 : 1.

So, ratio of times taken = 1 : 2.

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

$$\therefore \text{A's 1 day's work} = \frac{1}{6}; \text{ (2 times of B's work)}$$

$$\text{(A + B)'s 1 day's work} = \left( \frac{1}{6} + \frac{1}{12} \right) = \frac{3}{12} = \frac{1}{4}.$$

So, A and B together can finish the work in 4 days.

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**(6) 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:**

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

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

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

$$\begin{aligned}\therefore \text{(A + C)'s 1 day's work} &= \left( 2 \times \frac{1}{6} \right) - \left( \frac{1}{8} + \frac{1}{12} \right) \\ &= \left( \frac{1}{3} - \frac{5}{24} \right) \\ &= \frac{3}{24} \\ &= \frac{1}{8}.\end{aligned}$$

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

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(7) 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.  $[20 \times (50 - 5)] = \text{Rs. } 900$ .

Face value = Rs.  $(50 \times 20) = \text{Rs. } 1000$ .

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

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

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(8) The market value of a 10.5% stock, in which an income of Rs. 756 is derived by investing Rs. 9000, brokerage being  $\frac{1}{4}$ %, is:

[A] Rs. 108.25

[B] Rs. 112.20

[C] Rs. 124.75

[D] Rs. 125.25

**Answer : [C]**

**Explanation:**

For an income of Rs. 756, investment = Rs. 9000.

For an income of Rs.  $\frac{21}{2}$ , investment = Rs.  $\left(\frac{9000}{756} \times \frac{21}{2}\right) = \text{Rs. } 125$ .

∴ For a Rs. 100 stock, investment = Rs. 125.

Market value of Rs. 100 stock = Rs.  $\left(125 - \frac{1}{4}\right) = \text{Rs. } 124.75$

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(9) A vendor bought toffees at 6 for a rupee. How many for a rupee must he sell to gain 20%?

[A] 3

[B] 4

[C] 5

[D] 6

**Answer : [C]**

**Explanation:**

C.P. of 6 toffees = Re. 1

S.P. of 6 toffees = 120% of Re. 1 = Rs.  $\frac{6}{5}$

For Rs.  $\frac{6}{5}$ , toffees sold = 6.

For Re. 1, toffees sold =  $\left(6 \times \frac{5}{6}\right) = 5$ .

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(10) When a plot is sold for Rs. 18,700, the owner loses 15%. At what price must that plot be sold in order to gain 15%?

[A] Rs. 21,000

[B] Rs. 22,500

[C] Rs. 25,300

[D] Rs. 25,800

**Answer : [C]**

**Explanation:**

$$85 : 18700 = 115 : x$$
$$\Rightarrow x = \left(\frac{18700 \times 115}{85}\right) = 25300.$$

Hence, S.P. = Rs. 25,300.

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(11) A metallic sheet is of rectangular shape with dimensions 48 m x 36 m. From each of its corners, a square is cut off so as to make an open box. If the length of the square is 8 m, the volume of the box (in  $m^3$ ) is:

[A] 4830

[B] 5120

[C] 6420

[D] 8960

**Answer : [B]**

**Explanation:**

Clearly,  $l = (48 - 16)m = 32$  m,

$b = (36 - 16)m = 20$  m,

$h = 8$  m.

$$\therefore \text{Volume of the box} = (32 \times 20 \times 8) m^3 = 5120 m^3.$$

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

[A] 344.35  $cm^2$

[B] 462  $cm^2$

[C] 498.35  $cm^2$

[D] None of these

**Answer : [C]**

**Explanation:**

$h = 14$  cm,  $r = 7$  cm.

So,  $l = \sqrt{(7)^2 + (14)^2} = 15.5$  cm.

$\therefore$  Total surface area =  $\pi rl + \pi r^2$

$$= \left(\frac{22}{7} \times 7 \times 7 \times 15.5 + \frac{22}{7} \times 7 \times 7\right) cm^2$$

$$= [154(15.5 + 1)] cm^2$$

$$= (154 \times 3.236) cm^2$$

$$= 498.35 cm^2.$$

(13)

What should come in place of both  $x$  in the equation  $\frac{x}{128} = \frac{162}{x}$ .

- [A] 12
- [B] 14
- [C] 144
- [D] 196

**Answer : [A]**

**Explanation:**

$$\text{Let } \frac{x}{128} = \frac{162}{x}$$

$$\begin{aligned} \text{Then } x^2 &= 128 \times 162 \\ &= 64 \times 2 \times 18 \times 9 \\ &= 8^2 \times 6^2 \times 3^2 \\ &= 8 \times 6 \times 3 \\ &= 144. \\ \therefore x &= \sqrt{144} = 12. \end{aligned}$$

(14)

$\left( \frac{625}{11} \times \frac{14}{25} \times \frac{11}{196} \right)$  is equal to:

- [A] 5
- [B] 6
- [C] 8
- [D] 11

**Answer : [A]**

**Explanation:**

$$\text{Given Expression} = \frac{625}{11} \times \frac{14}{25} \times \frac{11}{196} = 5.$$

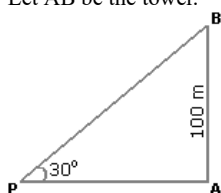
(15) From a point P on a level ground, the angle of elevation of the top tower is  $30^\circ$ . If the tower is 100 m high, the distance of point P from the foot of the tower is:

- [A] 149 m
- [B] 156 m
- [C] 173 m
- [D] 200 m

**Answer : [C]**

**Explanation:**

Let AB be the tower.



Then,  $\angle APB = 30^\circ$  and  $AB = 100$  m.

$$\frac{AB}{AP} = \tan 30^\circ = \frac{1}{\sqrt{3}}$$

$$\begin{aligned}\Rightarrow AP &= (AB \times 3) \text{ m} \\ &= 100 \times 3 \text{ m} \\ &= (100 \times 1.73) \text{ m} \\ &= 173 \text{ m}.\end{aligned}$$

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**(16) If 20% of  $a = b$ , then  $b\%$  of 20 is the same as:**

- [A] 4% of  $a$
- [B] 5% of  $a$
- [C] 20% of  $a$
- [D] None of these

**Answer : [A]**

**Explanation:**

$$20\% \text{ of } a = b \Rightarrow \frac{20}{100}a = b.$$

$$\therefore b\% \text{ of } 20 = \left( \frac{b}{100} \times 20 \right) = \left( \frac{20}{100}a \times \frac{1}{100} \times 20 \right) = \frac{4}{100}a = 4\% \text{ of } a.$$

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**(17) The population of a town increased from 1,75,000 to 2,62,500 in a decade. The average percent increase of population per year is:**

- [A] 4.37%
- [B] 5%
- [C] 6%
- [D] 8.75%

**Answer : [B]**

**Explanation:**

$$\text{Increase in 10 years} = (262500 - 175000) = 87500.$$

$$\text{Increase}\% = \left( \frac{87500}{175000} \times 100 \right)\% = 50\%.$$

$$\therefore \text{Required average} = \left( \frac{50}{10} \right)\% = 5\%.$$

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**(18)**

$$\frac{768 \times 768 \times 768 + 232 \times 232 \times 232}{768 \times 768 - 768 \times 232 + 232 \times 232} = ?$$

- [A] 1000
- [B] 536
- [C] 500
- [D] 268
- [E] None of these

**Answer : [A]**

**Explanation:**

$$\text{Given Exp.} = \frac{(a^3 + b^3)}{(a^2 - ab + b^2)} = (a + b) = (768 + 232) = 1000$$

(19) Which one of the following can't be the square of natural number ?

- [A] 30976
- [B] 75625
- [C] 28561
- [D] 143642
- [E] None of these

**Answer : [D]**

**Explanation:**

The square of a natural number never ends in 2.  
∴ 143642 is not the square of natural number.

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(20) A watch which gains uniformly is 2 minutes low at noon on Monday and is 4 min. 48 sec fast at 2 p.m. on the following Monday. When was it correct?

- [A] 2 p.m. on Tuesday
- [B] 2 p.m. on Wednesday
- [C] 3 p.m. on Thursday
- [D] 1 p.m. on Friday

**Answer : [B]**

**Explanation:**

Time from 12 p.m. on Monday to 2 p.m. on the following Monday = 7 days 2 hours = 170 hours.

∴ The watch gains  $\left(2 + 4\frac{4}{5}\right)$  min. or  $\frac{34}{5}$  min. in 170 hrs.

Now,  $\frac{34}{5}$  min. are gained in 170 hrs.

∴ 2 min. are gained in  $\left(170 \times \frac{5}{34} \times 2\right)$  hrs = 50 hrs.

∴ Watch is correct 2 days 2 hrs. after 12 p.m. on Monday *i.e.*, it will be correct at 2 p.m. on Wednesday.

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