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BMRCL Math Aptitude Sample Paper 2016 PDF Download

(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.

∴ 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.

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

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(2) 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.

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

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

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(3) The banker's gain on a bill due 1 year hence at 12% per annum is Rs. 6. The true discount is:

[A] Rs. 72

[B] Rs. 36

[C] Rs. 54

[D] Rs. 50

Answer : [D]

Explanation:

T.D. = $\frac{\text{B.G. x 100}}{\text{R x T}}$ = Rs. $\left(\frac{6 \times 100}{12 \times 1}\right)$ = Rs. 50.

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(4) The true discount on a bill of Rs. 540 is Rs. 90. The banker's discount is:

[A] Rs. 60

[B] Rs. 108

[C] Rs. 110

[D] Rs. 112

Answer : [B]

Explanation:
P.W. = Rs. (540 - 90) = Rs. 450.
∵ S.I. on Rs. 450 = Rs. 90.

S.I. on Rs. 540 = Rs. $\left(\dfrac{90}{450} \times 540 \right)$ = Rs. 108.

∴ B.D. = Rs. 108.

(5) 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.

(6) 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.

(7) A 6% stock yields 8%. The market value of the stock is:

[A] Rs. 48

[B] Rs. 75

[C] Rs. 96

[D] Rs. 133.33

Answer : [B]

Explanation:
For an income of Rs. 8, investment = Rs. 100.

For an income of Rs. 6, investment = Rs. $\left(\dfrac{8}{} \times 6 \right)$ = Rs. 75.

∴ Market value of Rs. 100 stock = Rs. 75.

(8) Sakshi invests a part of Rs. 12,000 in 12% stock at Rs. 120 and the remainder in 15% stock at Rs. 125. If his total dividend per annum is Rs. 1360, how much does he invest in 12% stock at Rs. 120?

[A] Rs. 4000

[B] Rs. 4500

[C] Rs. 5500

[D] Rs. 6000

Answer : [A]

Explanation:
Let investment in 12% stock be Rs. x.
Then, investment in 15% stock = Rs. (12000 - x).
∴ $\dfrac{12}{120} \times x + \dfrac{15}{125} \times (12000 - x) = 1360$.

⟹ $\dfrac{x}{10} + \dfrac{3}{25}(12000 - x) = 1360$.

⟹ $5x + 72000 - 6x = 1360 \times 50$
⟹ $x = 4000$.

(9) 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.
∴ Required percentage = $\left(\dfrac{295}{420} \times 100 \right)_{\%}$ = $\dfrac{1475}{21}$% = 70% (approximately).

(10) The cost price of 20 articles is the same as the selling price of x articles. If the profit is 25%, then the value of x is:

[A] 15

[B] 16

[C] 18

[D] 25

Answer : [B]

Explanation:
Let C.P. of each article be Re. 1 C.P. of x articles = Rs. x.
S.P. of x articles = Rs. 20.
Profit = Rs. (20 - x).
∴ $\left(\dfrac{20 - x}{x} \times 100 = 25 \right)$

$\Rightarrow$ 2000 - 100x = 25x
125x = 2000
$\Rightarrow$ x = 16.

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(11) A trader mixes 26 kg of rice at Rs. 20 per kg with 30 kg of rice of other variety at Rs. 36 per kg and sells the mixture at Rs. 30 per kg. His profit percent is:

[A] No profit, no loss

[B] 5%

[C] 8%

[D] 10%

[E] None of these

Answer : [B]

Explanation:
C.P. of 56 kg rice = Rs. (26 x 20 + 30 x 36) = Rs. (520 + 1080) = Rs. 1600.
S.P. of 56 kg rice = Rs. (56 x 30) = Rs. 1680.
$\therefore$ Gain = $\left(\dfrac{80}{1600} \times 100 \right)$ % = 5%.

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(12) 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 = $\left(\dfrac{18700 \times 115}{85} \right)$ = 25300.

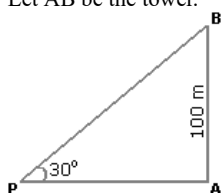Hence, S.P. = Rs. 25,300.

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(13) From a point P on a level ground, the angle of elevation of the top tower is 30?. 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? and AB = 100 m.
$\dfrac{AB}{AP}$ = tan 30? = $\dfrac{1}{3}$

$\Rightarrow$ AP = (AB x   3) m
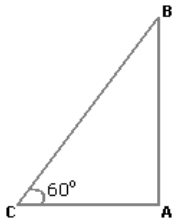
= 100   3 m

= (100 x 1.73) m

= 173 m.

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(14) The angle of elevation of a ladder leaning against a wall is 60? and the foot of the ladder is 4.6 m away from the wall. The length of the ladder is:

[A] 2.3 m

[B] 4.6 m

[C] 7.8 m

[D] 9.2 m

Answer : [D]

Explanation:
Let AB be the wall and BC be the ladder.

Then, $\angle$ACB = 60? and AC = 4.6 m.

$\dfrac{AC}{BC}$ = cos 60? = $\dfrac{1}{2}$

$\Rightarrow$ BC = 2 x AC
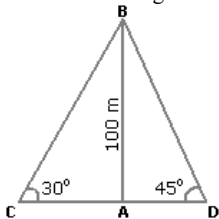
= (2 x 4.6) m

= 9.2 m.

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(15) Two ships are sailing in the sea on the two sides of a lighthouse. The angle of elevation of the top of the lighthouse is observed from the ships are 30? and 45? respectively. If the lighthouse is 100 m high, the distance between the two ships is:

[A] 173 m

[B] 200 m

[C] 273 m

[D] 300 m

Answer : [C]

Explanation:
Let AB be the lighthouse and C and D be the positions of the ships.

Then, AB = 100 m, $\angle$ACB = 30? and $\angle$ADB = 45?.

$\dfrac{AB}{AC}$ = tan 30? = $\dfrac{1}{3}$ $\Rightarrow$ AC = AB x   3 = 100   3 m.

$\dfrac{AB}{AD}$ = tan 45? = 1 $\Rightarrow$ AD = AB = 100 m.

∵ CD = (AC + AD) = (100 $\sqrt{3}$ + 100) m

= 100($\sqrt{3}$ + 1)

= (100 x 2.73) m

= 273 m.

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(16) The product of two numbers is 2028 and their H.C.F. is 13. The number of such pairs is:

[A] 1

[B] 2

[C] 3

[D] 4

Answer : [B]

Explanation:
Let the numbers 13a and 13b.
Then, 13a x 13b = 2028
$\Rightarrow$ ab = 12.
Now, the co-primes with product 12 are (1, 12) and (3, 4).
[Note: Two integers a and b are said to be **coprime** or relatively prime if they have no common positive factor other than 1 or, equivalently, if their greatest common divisor is 1]
So, the required numbers are (13 x 1, 13 x 12) and (13 x 3, 13 x 4).
Clearly, there are 2 such pairs.

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(17) The least number which should be added to 2497 so that the sum is exactly divisible by 5, 6, 4 and 3 is:

[A] 3

[B] 13

[C] 23

[D] 33

Answer : [C]

Explanation:
L.C.M. of 5, 6, 4 and 3 = 60.
On dividing 2497 by 60, the remainder is 37.
∴ Number to be added = (60 - 37) = 23.

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(18) The least number which when divided by 5, 6 , 7 and 8 leaves a remainder 3, but when divided by 9 leaves no remainder, is:

[A] 1677

[B] 1683

[C] 2523

[D] 3363

Answer : [B]

Explanation:
L.C.M. of 5, 6, 7, 8 = 840.
∴ Required number is of the form 840k + 3
Least value of k for which (840k + 3) is divisible by 9 is k = 2.
∴ Required number = (840 x 2 + 3) = 1683.

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(19) Find the highest common factor of 36 and 84.

[A] 4

[B] 6

[C] 12

[D] 18

Answer : [C]

Explanation:
$36 = 2^2 \times 3^2$
$84 = 2^2 \times 3 \times 7$
∴ H.C.F. $= 2^2 \times 3 = 12$.

(20) The greatest number which on dividing 1657 and 2037 leaves remainders 6 and 5 respectively, is:

[A] 123

[B] 127

[C] 235

[D] 305

Answer : [B]

Explanation:
Required number = H.C.F. of (1657 - 6) and (2037 - 5)
= H.C.F. of 1651 and 2032 = 127.