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DTL 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.

$\therefore$ 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 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%.

$\therefore$ 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 discount on a bill due 4 months hence at 15% is Rs. 420. The true discount is:

[A] Rs. 400

[B] Rs. 360

[C] Rs. 480

[D] Rs. 320

Answer : [A]

Explanation:

T.D. = $\frac{\text{B.D. x 100}}{\text{100 + (R x T)}}$

= Rs. $\left[\frac{420 \times 100}{100 + \left(15 \times \frac{1}{3}\right)}\right]$

= Rs. $\left(\frac{420 \times 100}{105}\right)$

= Rs. 400.

(4) The banker's gain on a sum due 3 years hence at 12% per annum is Rs. 270. The banker's discount is:

[A] Rs. 960

[B] Rs. 840

[C] Rs. 1020

[D] Rs. 760

Answer : [C]

Explanation:

$$\text{T.D.} = \left(\frac{\text{B.G.} \times 100}{\text{R} \times \text{T}}\right) = \text{Rs.} \left(\frac{270 \times 100}{12 \times 3}\right) = \text{Rs. } 750.$$

$\therefore$ B.D. = Rs.(750 + 270) = Rs. 1020.

(5) 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:

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

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

(6) The banker's discount of a certain sum of money is Rs. 72 and the true discount on the same sum for the same time is Rs. 60. The sum due is:

[A] Rs. 360

[B] Rs. 432

[C] Rs. 540

[D] Rs. 1080

Answer : [A]

Explanation:

$$\text{Sum} = \frac{\text{B.D.} \times \text{T.D.}}{\text{B.D.} - \text{T.D.}} = \text{Rs.} \left(\frac{72 \times 60}{72 - 60}\right) = \text{Rs.} \left(\frac{72 \times 60}{12}\right) = \text{Rs. } 360.$$

(7) 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. $\left(\frac{6 \text{ x } 100}{12 \text{ x } 1}\right)$ = Rs. 50.

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(8) If selling price is doubled, the profit triples. Find the profit percent.

[A]
$66\frac{2}{3}$

[B] 100

[C]
$105\frac{1}{3}$

[D] 120

Answer : [B]

Explanation:
Let C.P. be Rs. x and S.P. be Rs. y.
Then, $3(y - x) = (2y - x) \Rightarrow y = 2x$.
Profit = Rs. $(y - x)$ = Rs. $(2x - x)$ = Rs. x.
$\therefore$ Profit % = $\left(\frac{x}{x} \text{ x } 100\right)$% = 100%

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(9) 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. $(20 - x)$.
$\therefore$ $\left(\frac{20 - x}{x} \text{ x } 100 = 25\right)$

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

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(10) 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 = ^{80} x 100

$\left(\frac{}{1600}\right)\%$ = 5%.

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(11) 100 oranges are bought at the rate of Rs. 350 and sold at the rate of Rs. 48 per dozen. The percentage of profit or loss is:

[A]
$14\frac{2}{7}$% gain

[B] 15% gain

[C]
$14\frac{2}{7}$% loss

[D] 15 % loss

Answer : [A]

Explanation:
C.P. of 1 orange = Rs. $\left(\frac{350}{100}\right)$ = Rs. 3.50

S.P. of 1 orange = Rs. $\left(\frac{48}{12}\right)$ = Rs. 4

$\therefore$ Gain% = $\left(\frac{0.50}{3.50} \times 100\right)\%$ = $\frac{100}{7}\%$ = $14\frac{2}{7}\%$

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(12) On selling 17 balls at Rs. 720, there is a loss equal to the cost price of 5 balls. The cost price of a ball is:

[A] Rs. 45

[B] Rs. 50

[C] Rs. 55

[D] Rs. 60

Answer : [D]

Explanation:
(C.P. of 17 balls) - (S.P. of 17 balls) = (C.P. of 5 balls)
$\Rightarrow$ C.P. of 12 balls = S.P. of 17 balls = Rs.720.
$\Rightarrow$ C.P. of 1 ball = Rs. $\left(\frac{720}{12}\right)$ = Rs. 60.

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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

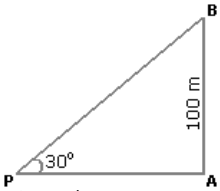
[B] 156 m

[C] 173 m

[D] 200 m

Answer : [C]

Explanation:
Let AB be the tower.



Then, ∠APB = 30? and AB = 100 m.

$\frac{AB}{AP} = \tan 30? = \frac{1}{3}$

$\Rightarrow AP = (AB \times 3)\ m$

$= 100\ 3\ m$

$= (100 \times 1.73)\ m$

$= 173\ m.$

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(14) An observer 1.6 m tall is 20 3 away from a tower. The angle of elevation from his eye to the top of the tower is 30?. The heights of the tower is:

[A] 21.6 m

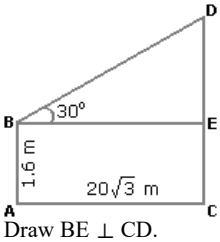
[B] 23.2 m

[C] 24.72 m

[D] None of these

Answer : [A]

Explanation:
Let AB be the observer and CD be the tower.



Draw BE ⊥ CD.
Then, CE = AB = 1.6 m,
BE = AC = 20 3 m.

$\frac{DE}{BE} = \tan 30? = \frac{1}{3}$

$\Rightarrow DE = \frac{20\ 3}{3} m = 20\ m.$

$\therefore$ CD = CE + DE = (1.6 + 20) m = 21.6 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

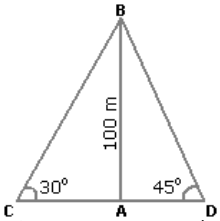
[B] 200 m

[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, ∠ACB = 30? and ∠ADB = 45?.

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

$\frac{AB}{AD}$ = tan 45? = 1 ⇒ AD = AB = 100 m.

∴ CD = (AC + AD) = (100 3 + 100) m

= 100(3 + 1)

= (100 x 2.73) m

= 273 m.

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(16) The difference between a two-digit number and the number obtained by interchanging the positions of its digits is 36. What is the difference between the two digits of that number?

[A] 3

[B] 4

[C] 9

[D] Cannot be determined

[E] None of these

Answer : [B]

Explanation:
Let the ten's digit be x and unit's digit be y.
Then, $(10x + y) - (10y + x) = 36$
$\Rightarrow 9(x - y) = 36$
$\Rightarrow x - y = 4$.

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(17) A two-digit number is such that the product of the digits is 8. When 18 is added to the number, then the digits are reversed. The number is:

[A] 18

[B] 24

[C] 42

[D] 81

Answer : [B]

Explanation:

Let the ten's and unit digit be x and $\frac{8}{x}$ respectively.

Then, $\left(10x + \frac{8}{x}\right) + 18 = 10 \text{ x } \frac{8}{x} + x$

$\Rightarrow 10x^2 + 8 + 18x = 80 + x^2$
$\Rightarrow 9x^2 + 18x - 72 = 0$
$\Rightarrow x^2 + 2x - 8 = 0$
$\Rightarrow (x + 4)(x - 2) = 0$
$\Rightarrow x = 2$.

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(18) The sum of the squares of three numbers is 138, while the sum of their products taken two at a time is 131. Their sum is:

[A] 20

[B] 30

[C] 40

[D] None of these

Answer : [A]

Explanation:
Let the numbers be a, b and c.
Then, $a^2 + b^2 + c^2 = 138$ and $(ab + bc + ca) = 131$.
$(a + b + c)^2 = a^2 + b^2 + c^2 + 2(ab + bc + ca) = 138 + 2 \times 131 = 400$.
$\Rightarrow (a + b + c) = \sqrt{400} = 20$.

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(19) Find a positive number which when increased by 17 is equal to 60 times the reciprocal of the number.

[A] 3

[B] 10

[C] 17

[D] 20

Answer : [A]

Explanation:
Let the number be x.
Then, $x + 17 = \frac{60}{x}$

$\Rightarrow x^2 + 17x - 60 = 0$
$\Rightarrow (x + 20)(x - 3) = 0$
$\Rightarrow x = 3$.

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(20) The sum of two number is 25 and their difference is 13. Find their product.

[A] 104

[B] 114

[C] 315

[D] 325

Answer : [B]

Explanation:
Let the numbers be x and y.
Then, $x + y = 25$ and $x - y = 13$.
$4xy = (x + y)^2 - (x - y)^2$
$= (25)^2 - (13)^2$
$= (625 - 169)$
$= 456$
$\therefore xy = 114$.
