Book For

Border Security Force

BSF 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%

---

(2) 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.

---

(3) 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

∴ B.D. = (T.D. + B.G.) = Rs. (36 + 1.62) = Rs. 37.62

---

(4) 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:

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

---

(5) The present worth of a sum due sometime hence is Rs. 576 and the banker's gain is Rs. 16. The true discount is:

[A] Rs. 36

[B] Rs. 72

[C] Rs. 48

[D] Rs. 96

Answer : [D]

Explanation:

$$\text{T.D.} = \text{P.W.} \times \text{B.G.} = 576 \times 16 = 96.$$

---

(6) 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.

$$\therefore \text{ Required percentage} = \left(\frac{295}{420} \times 100\right)\% = \frac{1475}{21}\% = 70\% \text{ (approximately).}$$

---

(7) 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).
$\therefore \left(\frac{20 - x}{x} \times 100 = 25\right)$

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

---

(8) A shopkeeper expects a gain of 22.5% on his cost price. If in a week, his sale was of Rs. 392, what was his profit?

[A] Rs. 18.20

[B] Rs. 70

[C] Rs. 72

[D] Rs. 88.25

Answer : [C]

Explanation:
C.P. = Rs. $\left(\frac{100}{122.5} \times 392\right)$ = Rs. $\left(\frac{1000}{1225} \times 392\right)$ = Rs. 320

$\therefore$ Profit = Rs. (392 - 320) = Rs. 72.

---

(9) Sam purchased 20 dozens of toys at the rate of Rs. 375 per dozen. He sold each one of them at the rate of Rs. 33. What was his percentage profit?

[A] 3.5

[B] 4.5

[C] 5.6

[D] 6.5

Answer : [C]

Explanation:
Cost Price of 1 toy = Rs. $\left(\frac{375}{12}\right)$ = Rs. 31.25

Selling Price of 1 toy = Rs. 33
So, Gain = Rs. (33 - 31.25) = Rs. 1.75
$\therefore$ Profit % = $\left(\frac{1.75}{31.25} \times 100\right)_{\%}$ = $\frac{28}{5}\%$ = 5.6%

---

(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%.

---

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

---

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

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

---

(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

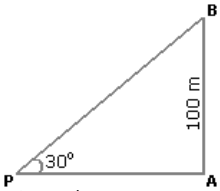
[B] 156 m

[C] 173 m

[D] 200 m

Answer : [C]

Explanation:
Let AB be the tower.



Then, ∠APB = 30? and AB = 100 m.

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

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

$= 100\ 3\ m$

$= (100 \times 1.73)\ m$

$= 173\ m.$

---

(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

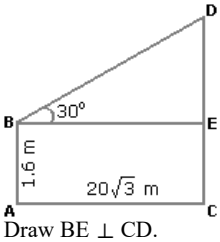
[B] 23.2 m

[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.

---

(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

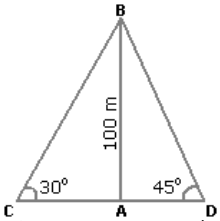
[B] 200 m

[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.

---

(16) 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 $(ab + bc + ca) = 131$.
$(a + b + c)^2 = a^2 + b^2 + c^2 + 2(ab + bc + ca) = 138 + 2 \times 131 = 400$.
⇒ $(a + b + c) = \sqrt{400} = 20$.

---

(17) A number consists of two digits. If the digits interchange places and the new number is added to the original number, then the resulting number will be divisible by:

[A] 3

[B] 5

[C] 9

[D] 11

Answer : [D]

Explanation:
Let the ten's digit be x and unit's digit be y.
Then, number = $10x + y$.
Number obtained by interchanging the digits = $10y + x$.
∴ $(10x + y) + (10y + x) = 11(x + y)$, which is divisible by 11.

---

(18) 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, $x + 17 = \frac{60}{x}$

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

---

(19) The product of two numbers is 9375 and the quotient, when the larger one is divided by the smaller, is 15. The sum of the numbers is:

[A] 380

[B] 395

[C] 400

[D] 425

Answer : [C]

Explanation:
Let the numbers be x and y.
Then, $xy = 9375$ and $\frac{x}{y} = 15$.

$\frac{xy}{(x/y)} = \frac{9375}{15}$

$\Rightarrow y^2 = 625.$
$\Rightarrow y = 25.$
$\Rightarrow x = 15y = (15 \times 25) = 375.$
$\therefore$ Sum of the numbers = $x + y = 375 + 25 = 400.$

---

(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 $x - y = 13$.
$4xy = (x + y)^2 - (x- y)^2$
$= (25)^2 - (13)^2$
$= (625 - 169)$
$= 456$
$\therefore xy = 114.$
