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JVVNL Math Aptitude Sample Paper 2016 PDF Download

(1) 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:

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

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

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

$$= \text{Rs. } 400.$$

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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:

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

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

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(3) 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:

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

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(4) 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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(5)

The banker's gain on a certain sum due $1\frac{1}{2}$ years hence is $\frac{3}{25}$ of the banker's **discount. The rate percent is:**

[A]
$5\frac{1}{5}\%$

[B]
$9\frac{1}{11}\%$

[C]
$8\frac{1}{8}\%$

[D]
$6\frac{1}{6}\%$

Answer : [B]

Explanation:

Let, B.D = Re. 1.

Then, B.G. = Re. $\frac{3}{25}$.

$\therefore$ T.D. = (B.D. - B.G.) = Re. $\left(1 - \frac{3}{25}\right)$ = Re. $\frac{22}{25}$.

Sum = $\left(\frac{1 \text{ x } (22/25)}{1-(22/25)}\right)$ = Rs. $\frac{22}{3}$.

S.I. on Rs. $\frac{22}{3}$ for $1\frac{1}{2}$ years is Re. 1.

$\therefore$ Rate = $\left(\frac{100 \text{ x } 1}{\frac{22}{3} \text{ x } \frac{3}{2}}\right)\%$ = $\frac{100}{11}$ = $9\frac{1}{11}\%$.

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(6) 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).

$\therefore$ $\frac{12}{120} \text{ x } x + \frac{15}{125} \text{ x } (12000 - x) = 1360$.

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

$\Rightarrow 5x + 72000 - 6x = 1360 \text{ x } 50$

$\Rightarrow x = 4000$.

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(7) A 12% stock yielding 10% is quoted at:

[A] Rs. 83.33

[B] Rs. 110

[C] Rs. 112

[D] Rs. 120

Answer : [D]

Explanation:
To earn Rs. 10, money invested = Rs. 100.
To earn Rs. 12, money invested = Rs. $\left(\frac{100}{10} \times 12\right)$ = Rs. 120.

$\therefore$ Market value of Rs. 100 stock = Rs. 120.

(8)
The cost price of a Rs. 100 stock at 4 discount, when brokerage is $\frac{1}{4}$% is:

[A] Rs. 95.75

[B] Rs. 96

[C] Rs. 96.25

[D] Rs. 104.25

Answer : [C]

Explanation:
C.P. = Rs. $\left(100 - 4 + \frac{1}{4}\right)$ = Rs. 96.25

(9) A man invested Rs. 1552 in a stock at 97 to obtain an income of Rs. 128. The dividend from the stock is:

[A] 7.5%

[B] 8%

[C] 9.7%

[D] None of these

Answer : [B]

Explanation:
By investing Rs. 1552, income = Rs. 128.
By investing Rs. 97, income = Rs. $\left(\frac{128}{1552} \times 97\right)$ = Rs. 8.

$\therefore$ Dividend = 8%

(10) 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. $\left(\frac{9000}{756} \times \frac{21}{2}\right)$ = Rs. 125.

$\therefore$ For a Rs. 100 stock, investment = Rs. 125.
Market value of Rs. 100 stock = Rs. $\left(125 - \frac{1}{4}\right)$ = Rs. 124.75

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(11) The square root of (7 + 3 5) (7 - 3 5) is

[A] 5

[B] 2

[C] 4

[D]

3 5

Answer : [B]

Explanation:
(7 + 3 5)(7 - 3 5) = $(7)^2 - (3\ 5)^2$ = 49 - 45 = 4 = 2.

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(12)
If 5 = 2.236, then the value of $\frac{5}{2} - \frac{10}{5} +$ 125 is equal to:

[A] 5.59

[B] 7.826

[C] 8.944

[D] 10.062

Answer : [B]

Explanation:
$\frac{5}{2} - \frac{10}{5} +$ 125 = $\frac{(5)^2 - 20 + 2\ 5 \times 5\ 5}{2\ 5}$

= $\frac{5 - 20 + 50}{2\ 5}$

= $\frac{35}{2\ 5} \times \frac{5}{5}$

= $\frac{35\ 5}{10}$

= $\frac{7 \times 2.236}{2}$

= 7 x 1.118

= 7.826

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(13) A group of students decided to collect as many paise from each member of group as is the number of members. If the total collection amounts to Rs. 59.29, the number of the member is the group is:

[A] 57

[B] 67

[C] 77

[D] 87

Answer : [C]

Explanation:
Money collected = (59.29 x 100) paise = 5929 paise.
∴ Number of members = $\sqrt{5929}$ = 77.

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(14) If $a = 0.1039$, then the value of $4a^2 - 4a + 1 + 3a$ is:

[A] 0.1039

[B] 0.2078

[C] 1.1039

[D] 2.1039

Answer : [C]

Explanation:
$4a^2 - 4a + 1 + 3a = (1)^2 + (2a)^2 - 2 \times 1 \times 2a + 3a$
$= (1 - 2a)^2 + 3a$
$= (1 - 2a) + 3a$
$= (1 + a)$
$= (1 + 0.1039)$
$= 1.1039$

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(15)
$\left(3 - \frac{1}{3}\right)^2$ simplifies to:

[A]
$\frac{3}{4}$

[B]
$\frac{4}{3}$

[C]
$\frac{4}{3}$

[D] None of these

Answer : [C]

Explanation:
$\left(3 - \frac{1}{3}\right)^2 = (3)^2 + \left(\frac{1}{3}\right)^2 - 2 \times 3 \times \frac{1}{3}$

$= 3 + \frac{1}{3} - 2$

$= 1 + \frac{1}{3}$

$= \frac{4}{3}$

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(16) In how many different ways can the letters of the word 'CORPORATION' be arranged so that the vowels always come together?

[A] 810

[B] 1440

[C] 2880

[D] 50400

[E] 5760

Answer : [D]

Explanation:
In the word 'CORPORATION', we treat the vowels OOAIO as one letter.
Thus, we have CRPRTN (OOAIO).
This has 7 (6 + 1) letters of which R occurs 2 times and the rest are different.
Number of ways arranging these letters = $\frac{7!}{2!}$ = 2520.

Now, 5 vowels in which O occurs 3 times and the rest are different, can be arranged
in $\frac{5!}{3!}$ = 20 ways.

∴ Required number of ways = (2520 x 20) = 50400.

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(17) In how many ways can the letters of the word 'LEADER' be arranged?

[A] 72

[B] 144

[C] 360

[D] 720

[E] None of these

Answer : [C]

Explanation:
The word 'LEADER' contains 6 letters, namely 1L, 2E, 1A, 1D and 1R.
∴ Required number of ways = $\frac{6!}{(1!)(2!)(1!)(1!)(1!)}$ = 360.

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(18) In a group of 6 boys and 4 girls, four children are to be selected. In how many different ways can they be selected such that at least one boy should be there?

[A] 159

[B] 194

[C] 205

[D] 209

[E] None of these

Answer : [D]

Explanation:
We may have (1 boy and 3 girls) or (2 boys and 2 girls) or (3 boys and 1 girl) or (4 boys).
∴ Required number of ways $= ({}^6C_1 \times {}^4C_3) + ({}^6C_2 \times {}^4C_2) + ({}^6C_3 \times {}^4C_1) + ({}^6C_4)$

$= ({}^6C_1 \times {}^4C_1) + ({}^6C_2 \times {}^4C_2) + ({}^6C_3 \times {}^4C_1) + ({}^6C_2)$

$= (6 \times 4) + \left(\frac{6 \times 5}{2 \times 1} \times \frac{4 \times 3}{2 \times 1}\right) + \left(\frac{6 \times 5 \times 4}{3 \times 2 \times 1} \times 4\right) + \left(\frac{6 \times 5}{2 \times 1}\right)$

$= (24 + 90 + 80 + 15)$

$= 209.$

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(19) In how many ways a committee, consisting of 5 men and 6 women can be formed from 8 men and 10 women?

[A] 266

[B] 5040

[C] 11760

[D] 86400

[E] None of these

Answer : [C]

Explanation:

Required number of ways $= ({}^{8}C_5 \times {}^{10}C_6)$

$= ({}^{8}C_3 \times {}^{10}C_4)$

$= \left(\frac{8 \times 7 \times 6}{3 \times 2 \times 1} \times \frac{10 \times 9 \times 8 \times 7}{4 \times 3 \times 2 \times 1}\right)$

$= 11760.$

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(20) In how many different ways can the letters of the word 'MATHEMATICS' be arranged so that the vowels always come together?

[A] 10080

[B] 4989600

[C] 120960

[D] None of these

Answer : [C]

Explanation:

In the word 'MATHEMATICS', we treat the vowels AEAI as one letter.
Thus, we have MTHMTCS (AEAI).
Now, we have to arrange 8 letters, out of which M occurs twice, T occurs twice and the rest are different.

$\therefore$ Number of ways of arranging these letters $= \frac{8!}{(2!)(2!)} = 10080.$

Now, AEAI has 4 letters in which A occurs 2 times and the rest are different.

Number of ways of arranging these letters $= \frac{4!}{2!} = 12.$

$\therefore$ Required number of words = (10080 x 12) = 120960.
