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(1) 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.

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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:

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

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

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

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

(6) 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.
$\therefore$ Volume of the box = (32 x 20 x 8) m^3 = 5120 m^3.

(7) 50 men took a dip in a water tank 40 m long and 20 m broad on a religious day. If the average displacement of water by a man is 4 m^3, then the rise in the water level in the tank will be:

[A] 20 cm

[B] 25 cm

[C] 35 cm

[D] 50 cm

Answer : [B]

Explanation:
Total volume of water displaced = (4 x 50) m^3 = 200 m^3.
∴ Rise in water level = $\left(\frac{200}{40 \times 20}\right)$ m 0.25 m = 25 cm.

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(8) A cistern 6m long and 4 m wide contains water up to a depth of 1 m 25 cm. The total area of the wet surface is:

[A] 49 m^2

[B] 50 m^2

[C] 53.5 m^2

[D] 55 m^2

Answer : [A]

Explanation:
Area of the wet surface = [2(*lb* + *bh* + *lh*) - *lb*]

= 2(*bh* + *lh*) + *lb*

= [2 (4 x 1.25 + 6 x 1.25) + 6 x 4] m^2

= 49 m^2.

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(9) The slant height of a right circular cone is 10 m and its height is 8 m. Find the area of its curved surface.

[A] 30π m^2

[B] 40π m^2

[C] 60π m^2

[D] 80π m^2

Answer : [C]

Explanation:
l = 10 m,
h = 8 m.
So, $r = l^2 - h^2 = (10)^2 - 8^2 = 6$ m.
∴ Curved surface area = π*rl* = (π x 6 x 10) m^2 = 60π m^2.

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(10) A boat having a length 3 m and breadth 2 m is floating on a lake. The boat sinks by 1 cm when a man gets on it. The mass of the man is:

[A] 12 kg

[B] 60 kg

[C] 72 kg

[D] 96 kg

Answer : [B]

Explanation:
Volume of water displaced = (3 x 2 x 0.01) m^3

= 0.06 m^3.

∴ Mass of man = Volume of water displaced x Density of water

= (0.06 x 1000) kg

= 60 kg.

(11) A large cube is formed from the material obtained by melting three smaller cubes of 3, 4 and 5 cm side. What is the ratio of the total surface areas of the smaller cubes and the large cube?

[A] 2 : 1

[B] 3 : 2

[C] 25 : 18

[D] 27 : 20

Answer : [C]

Explanation:
Volume of the large cube = $(3^3 + 4^3 + 5^3) = 216$ cm^3.
Let the edge of the large cube be a.
So, $a^3 = 216 \Rightarrow a = 6$ cm.
$\therefore$ Required ratio = $\left(\frac{6 \times (3^2 + 4^2 + 5^2)}{6 \times 6^2}\right) = \frac{50}{36} = 25 : 18.$

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(12) The curved surface area of a cylindrical pillar is 264 m^2 and its volume is 924 m^3. Find the ratio of its diameter to its height.

[A] 3 : 7

[B] 7 : 3

[C] 6 : 7

[D] 7 : 6

Answer : [B]

Explanation:
$\frac{\pi r^2 h}{2\pi rh} = \frac{924}{264} \Rightarrow r = \left(\frac{924}{264} \times 2\right) = 7$ m.

And, $2\pi rh = 264 \Rightarrow h = \left(264 \times \frac{7}{22} \times \frac{1}{2} \times \frac{1}{7}\right) = 6$m.

$\therefore$ Required ratio = $\frac{2r}{h} = \frac{14}{6} = 7 : 3.$

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(13) A cistern of capacity 8000 litres measures externally 3.3 m by 2.6 m by 1.1 m and its walls are 5 cm thick. The thickness of the bottom is:

[A] 90 cm

[B] 1 dm

[C] 1 m

[D] 1.1 cm

Answer : [B]

Explanation:
Let the thickness of the bottom be x cm.
Then, $[(330 - 10) \times (260 - 10) \times (110 - x)] = 8000 \times 1000$
$\Rightarrow 320 \times 250 \times (110 - x) = 8000 \times 1000$
$\Rightarrow (110 - x) = \frac{8000 \times 1000}{320 \times 250} = 100$

$\Rightarrow x = 10$ cm $= 1$ dm.

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(14) How many bricks, each measuring 25 cm x 11.25 cm x 6 cm, will be needed to build a wall of 8 m x 6 m x 22.5 cm?

[A] 5600

[B] 6000

[C] 6400

[D] 7200

Answer : [C]

Explanation:

$$\text{Number of bricks} = \frac{\text{Volume of the wall}}{\text{Volume of 1 brick}} = \left(\frac{800 \times 600 \times 22.5}{25 \times 11.25 \times 6}\right) = 6400.$$

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(15) 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, $l = \sqrt{(7)^2 + (14)^2} = \sqrt{245} = 7\sqrt{5}$ cm.

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

$$= \left(\frac{22}{7} \times 7 \times 7\sqrt{5} + \frac{22}{7} \times 7 \times 7\right) cm^2$$

$$= [154(\sqrt{5} + 1)]\ cm^2$$

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

$$= 498.35\ cm^2.$$

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(16) The last day of a century cannot be

[A] Monday

[B] Wednesday

[C] Tuesday

[D] Friday

Answer : [C]

Explanation:

100 years contain 5 odd days.

$\therefore$ Last day of 1^{st} century is Friday.

200 years contain (5 x 2) $\equiv$ 3 odd days.

$\therefore$ Last day of 2^{nd} century is Wednesday.

300 years contain (5 x 3) = 15 $\equiv$ 1 odd day.

$\therefore$ Last day of 3^{rd} century is Monday.

400 years contain 0 odd day.

$\therefore$ Last day of 4^{th} century is Sunday.

This cycle is repeated.

$\therefore$ Last day of a century cannot be Tuesday or Thursday or Saturday.

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(17) If 6^{th} March, 2005 is Monday, what was the day of the week on 6^{th} March, 2004?

[A] Sunday

[B] Saturday

[C] Tuesday

[D] Wednesday

Answer : [A]

Explanation:
The year 2004 is a leap year. So, it has 2 odd days.
But, Feb 2004 not included because we are calculating from March 2004 to March 2005. So it has 1 odd day only.
∴ The day on 6^{th} March, 2005 will be 1 day beyond the day on 6^{th} March, 2004.
Given that, 6^{th} March, 2005 is Monday.
∴ 6^{th} March, 2004 is Sunday (1 day before to 6^{th} March, 2005).

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(18) On 8^{th} Feb, 2005 it was Tuesday. What was the day of the week on 8^{th} Feb, 2004?

[A] Tuesday

[B] Monday

[C] Sunday

[D] Wednesday

Answer : [C]

Explanation:
The year 2004 is a leap year. It has 2 odd days.
∴ The day on 8^{th} Feb, 2004 is 2 days before the day on 8^{th} Feb, 2005.
Hence, this day is Sunday.

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(19) January 1, 2007 was Monday. What day of the week lies on Jan. 1, 2008?

[A] Monday

[B] Tuesday

[C] Wednesday

[D] Sunday

Answer : [B]

Explanation:
The year 2007 is an ordinary year. So, it has 1 odd day.
1^{st} day of the year 2007 was Monday.
1^{st} day of the year 2008 will be 1 day beyond Monday.
Hence, it will be Tuesday.

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(20) January 1, 2008 is Tuesday. What day of the week lies on Jan 1, 2009?

[A] Monday

[B] Wednesday

[C] Thursday

[D] Sunday

Answer : [C]

Explanation:
The year 2008 is a leap year. So, it has 2 odd days.
1^{st} day of the year 2008 is Tuesday (Given)
So, 1^{st} day of the year 2009 is 2 days beyond Tuesday.
Hence, it will be Thursday.
