



Date : 21st Dec 2023

Quantitative Aptitude - Mensuration

English

Q:1 Find the volume of a toy of total height 108 cm made by joining a conical hat on a cylindrical bottle of radius 56 cm. (in cm^3)

1. 1419624
2. 1823734
3. 1966723
4. 1035600

Q:2 Fourteen spheres of equal radii are made by melting an iron cuboid of dimension $[16 \text{ cm} \times 11 \text{ cm} \times 9 \text{ cm}]$. Find the radius of each iron sphere.

1. 3 cm
2. 2 cm
3. 5 cm
4. 4 cm

Q:3 The diameter of a cylindrical tower is 32 meters and its height is 42 meters. The cost of painting the curved surface of the cylinder at 1.5 rupees per square meter is:

1. Rs 6336
2. Rs 4224
3. Rs 8448
4. Rs 4466

Q:4 The longest side of a right triangle is 12 cm and the height is 10 cm. Find the area of the right triangle.

1. $5\sqrt{11} \text{ cm}^2$
2. $10\sqrt{11} \text{ cm}^2$
3. $15\sqrt{11} \text{ cm}^2$
4. $\sqrt{11} \text{ cm}^2$

Q:5 The length of the body diagonal of the cuboid with a square base is $\sqrt{123} \text{ cm}$. If the sides of the cuboid are integers then, what is the sum of the length of all the edges?

1. 52
2. 76
3. 100
4. None of these

Q:6 A frustum of a cone has a base radius of 1.5cm and a height of 7cm. The radius of the top of the frustum is 0.5cm. Find the volume of the frustum.

1. 11.11 cm^3
2. 23.83 cm^3
3. 27.85 cm^3
4. 37.10 cm^3

Q:7 The diameter of a 100 cm long roller, is 21 cm. If it takes 1200 complete revolutions to level a playground then, find the cost of leveling it at 50 paise per square meter.

1. Rs 396
2. Rs 484
3. Rs 516
4. Rs 325

Q:8 The radius and the height of the cylinder are 7 cm and 12 cm respectively. The cylinder is smelted to make n number of small cones of radius 3.5 cm and height 2 cm. What is the value of n?

1. 72
2. 144
3. 36
4. 64

Q:9 Find the total surface area of a cylinder whose radius is 15 cm and height is 12 cm. (Use $\pi = 22/7$)

1. 2645.7 cm^2
2. 2545.7 cm^2
3. 2145.7 cm^2
4. 2945.7 cm^2

Q:10 The cuboid's length, breadth, and height are in the ratio of 7 : 2 : 1, and the breadth of the cuboid is 8 cm. Find the total surface area of the cuboid.

1. 666 cm^2
2. 336 cm^2
3. 736 cm^2
4. 636 cm^2



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Answer Key

1. (1)	2. (1)	3. (1)	4. (2)	5. (4)
6. (2)	7. (1)	8. (1)	9. (2)	10. (3)

Answers and Solutions

Q:1 The correct answer is **Option 1** i.e. **1419624**.

We know that,

Volume of cylindrical part = $\pi r^2 h_1$

Volume of conical part = $(1/3)\pi r^2 h_2$

Since the radius is same and we have the total height,

Total volume = $\pi r^2 h_1 + (1/3)\pi r^2 h_2 = 4/3\pi r^2 (h_1 + h_2)$ or $(4/3)\pi r^2 H$ (where H is total height)

= $4/3 \times 22/7 \times 56 \times 56 \times 108 = 1419264 \text{ cm}^3$

Q:2 The correct answer is **option 1** i.e. **3 cm**.

Let, the radius of the sphere be r

Here, $14(\text{Volume of sphere}) = \text{Volume of cuboid}$

$\Rightarrow 14[(4/3)\pi r^3] = l \times b \times h$

$\Rightarrow 14[(4/3)(22/7)r^3] = 16 \times 11 \times 9$

$\Rightarrow r^3 = (16 \times 11 \times 9 \times 3 \times 7)/(14 \times 4 \times 22)$

$\Rightarrow r^3 = 27$

$\Rightarrow r = 3$

Hence, the radius of the sphere = 3 cm

Q:3 The correct answer is **option 1** i.e. **Rs 6336**.

Formula:

Area of the curved surface = $2\pi rh$

Given:

Diameter = 32 meters

So, Radius = $32/2 = 16$ meters

Height = 42 meters

Cost = 1.5 rupees per square meter

Area of the curved surface = $[2 \times (22/7) \times 16 \times 42] = 4224 \text{ sq. m}$

\therefore Cost of painting = Rs (4224 \times 1.5) = Rs 6336

Q:4 The correct answer is **Option 2** i.e. **$10\sqrt{11}\text{cm}^2$** .

Given:

The longest side of a right triangle is 12 cm = Hypotenuse

Height = 10 cm

Using Pythagoras theorem, the base can be calculated as follows:

$$(\text{Hypotenuse})^2 = (\text{Base})^2 + (\text{Height})^2$$

$$(12)^2 = (\text{Base})^2 + (10)^2$$

$$(\text{Base})^2 = 12^2 - 10^2$$

$$(\text{Base})^2 = 144 - 100$$

$$(\text{Base})^2 = 44$$

$$\text{Hence, Base} = 2\sqrt{11} \text{ cm}$$

Therefore, the base of the right triangle is $2\sqrt{11} \text{ cm}$.

Area of right triangle = $(\frac{1}{2}) \times b \times h$ square units

Substituting the values in the formula, we get

$$A = (\frac{1}{2}) \times 2\sqrt{11} \times 10 \text{ cm}^2$$

$$A = 10\sqrt{11} \text{ cm}^2$$

Therefore, the area of the right triangle is $10\sqrt{11} \text{ cm}^2$.

Q:5 The correct answer is **option 4** i.e. **None of these**.

Let the sides of the cuboid be a, a, and b respectively

Length of diagonal of the cuboid = $\sqrt{(a^2 + a^2 + b^2)}$

$$= \sqrt{123} \text{ cm}$$

$$\Rightarrow 2a^2 + b^2 = 123 \text{ cm}$$

By hit and trial, you would get,

$$\Rightarrow a = 1, b = 11$$

$$\Rightarrow a = 7, b = 5$$

Thus sum of lengths could be = $11 + 2 = 13 \text{ cm}$ or $5 + 14 = 19 \text{ cm}$

So, the answer will be none of these

Q:6 The correct answer is **option 2** i.e. **23.83cm^3**

The volume of the frustum of the cone =

$$(1/3)\pi H(r^2 + r'^2 + r \times r')$$

Where H is the height, r and r' are the radius at the base and top respectively.

$$\Rightarrow (1/3)\pi H(r^2 + r'^2 + r \times r')$$

$$\Rightarrow (1/3) \times (22/7) \times (7) \times ((1.5)^2 + (0.5)^2 + 1.5 \times 0.5)$$

$$\Rightarrow (22/3) \times (2.25 + 0.25 + 0.75)$$

$$\Rightarrow 23.83\text{cm}^3$$

Q:7 The correct answer is **Option 1** i.e. **Rs 396**.

The surface area of the cylinder = $2\pi rh$

Total area for leveling the ground = Number of revolutions \times Surface area

The cost of leveling = Cost per unit \times total area

Radius of the roller = $21/2 \text{ cm}$ and, its length = 100 cm

Area covered by the roller in 1 revolution

$$\Rightarrow 2 (22/7) (21/2) \times 100 = 6600 \text{ cm}^2$$



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Area covered by the roller in the 1200 revolution

$$\Rightarrow 1200 \times 6600 = 7920000 \text{ cm}^2 = 792 \text{ m}^2$$

The cost of leveling the ground

$$\Rightarrow 792 \times (50/100) = \text{Rs.}396$$

Q:8 The correct answer is **option 1** i.e. **72**

The volume of the cylinder = $\pi r^2 h$

$$\Rightarrow (22/7) \times 7 \times 7 \times 12$$

$$\Rightarrow 1848 \text{ cm}^3$$

The volume of the cone = $(1/3)\pi r^2 h$

$$\Rightarrow (1/3) \times (22/7) \times 3.5 \times 3.5 \times 2$$

$$\Rightarrow 77/3 \text{ cm}^3$$

Number of cones formed = $1848 / (77/3)$

$$\Rightarrow 72 \text{ cones}$$

Q:9 The correct answer is **Option 2** i.e. **2545.7 cm²**

Radius of cylinder = 15 cm

Height of cylinder = 12 cm

Total surface area of cylinder = $2\pi r(h + r)$ (where, r = Radius and h = height of cylinder)

$$\text{Total surface area of cylinder} = 2 \times 22/7 \times 15(12 + 15) = 2 \times 22/7 \times 15(27) = 2 \times 22/7 \times 405$$

$$= 17820/7 = 2545.7 \text{ cm}^2$$

Q:10 The correct answer is **Option 3** i.e. **736 cm²**.

The ratio of length, breadth, and height = 7 : 2 : 1 =

$$7x : 2x : x$$

Breadth = 8 cm

$$\Rightarrow 2x = 8$$

$$\Rightarrow x = 4$$

So, length = $7x = 28$ cm, breadth = $2x = 8$ cm and height = $x = 4$ cm

T.S.A of cuboid = $2(lb + bh + hl)$

here, l = length, b = breadth and h = height

$$\text{Total surface area of cuboid} = 2(28 \times 8 + 8 \times 4 + 4 \times 28)$$

$$\Rightarrow 2(224 + 32 + 112) = 2 \times 368 = 736 \text{ cm}^2$$