Mensuration Solution

1. Answer: (C)

Curved surface of cone = $\frac{22}{7} \times r \times l$

$= 1914\ cm^2$

Where r is radius and l is slant height of cone

$l = \frac{1914}{22} \times \frac{7}{21} = 29\ cm$

Height of cone = $\sqrt{29^2 - 21^2} = 20cm$

Perimeter of square = 2 × 20 = 40 cm

Side of square = $\frac{40}{4} = 10cm$

Area of square = $10^2 = 100cm^2$

2. Answer: (D)

Let radius & height of cone be 4x and 3x respectively

ATQ –

$\frac{1}{3}\pi r^2 h = 2156$

$\frac{1}{3} \times \frac{22}{7} \times (4x)^2 \times 3x = 2156$

$x^3 = \frac{2156 \times 7}{22 \times 16}$

$x^3 = 42.875$

$x = 3.5\ cm$

Radius of cylinder = $3.5 \times 4 \times \frac{150}{100} = 21cm$

Volume of cylinder = $\frac{22}{7} \times 21 \times 21 \times 10.5$

= 14553 cm^3

3. Answer: (D)

Volume of cylinder (s) = $\pi r^2 h$

(r → radius)

(h → height)

Volume of cone (c) = $\frac{1}{3}\pi R^2 H$

(R → radius)

(H → height)

h = H = 10 cm

ATQ,

$\pi r^2 h + \frac{1}{3}\pi R^2 h = 2190\pi$

$\pi \times 10\left[r^2 + \frac{1}{3} \times 15 \times 15\right] = 2190\pi$

r = 12

$\therefore \frac{r}{R} = \frac{12}{15} = 4 : 5$

4. Answer: (A):

Volume of cone (A) = $\pi(r_1)^2 h_1/3$

Here, r_1 = radius of cone

h_1 = height of cone

Volume of cylinder (H) = $\pi(r_2)^2 h_2$

Here, r_2 = radius of cylinder = 12 cm

h_2 = height of cylinder

According to question = $h_1 = h_2 = 20$ cm

And,

$\Rightarrow \pi(r_1)^2 h_1/3 + \pi(r_2)^2 h_2 = 5040\ \pi$

$\Rightarrow \pi \times 20\ ((r_1)^2/3 + (12)^2) = 5040\ \pi$

$\Rightarrow (r_1)^2/3 = 252 - 144$

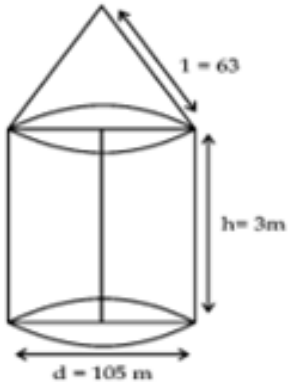
$\Rightarrow (r_1)^2 = 324$

$\Rightarrow r_1 = 18$ cm

$\therefore$ Ratio of radius of A to radius of H

$= r_1 : r_2 = 18 : 12 = 3 : 2$

5. Answer: (A)



$\therefore$ radius of cone = $\frac{105}{2}$ m

Slant height of cone = 63m

$\Rightarrow$ curved surface area of cone = (πrl)

$= \frac{22}{7} \times \frac{105}{2} \times = 63 = 10395m^2$

Radius of cylinder = $\frac{105}{2}$ m

Height = 3m (given)

$\therefore$ curved surface area of cylinder = $2\ \pi rh$

$= 2 \times \frac{22}{7} \times \frac{105}{2} \times = 990m^2$

Total curved area of structure

$\Rightarrow$ curved area of cone + curved area of cylinder = 10395 + 990

$= 11385m^2$

$\therefore$ total area of canvas = $11385m^2$

6. Answer: (A)

Let radius of cylinder be r cm

ATQ

$\frac{4}{3}\pi r^3 = \pi r^2 h$ (where h = 16cm)
r = 12 cm
Required volume = $\frac{1}{3}\pi r^2 h$
$= \frac{1}{3} \times \pi \times 12 \times 12 \times 16$
$= 768\pi\ cm^3$

7. Answer: (B)
Let r be the radius of the sphere.
Given, $4\pi r^2 = 616$
r = 7 cm
So, side of the square = 7 cm
Now, perimeter of the square = 4 × 7 = 28cm

8. Answer: (E)
Volume of hemispherical bowl = $\frac{2}{3}\pi r^3$
∴ Diameter = 54 cm
∴ Radius = $\frac{54}{2} = 27cm$
Now, volume of hemispherical bowl
$= \frac{2}{3} \times \frac{22}{7} \times 27 \times 27 \times 27$
Volume of the cylindrical bottle $\pi r^2 h$
$= \frac{22}{7} \times 3 \times 3 \times 9$
∴ Number of bottles required
$= \frac{2}{3} \times \frac{22}{7} \times \frac{27 \times 27 \times 27 \times 7}{22 \times 3 \times 3 \times 9} = 162$

9. Answer: (D)
A sphere is melted and molded into solid cylinder.
Formula Used:
volume of sphere = 4/3 × 22/7 × r^3;
total surface area of sphere = 4 × 22/7 × r^2; where r = radius of sphere
volume of cylinder = 22/7 × R^2 × h
total surface area of cylinder = 2 × 22/7 × R(R + h); where R = radius of cylinder, h = height of cylinder
Given radius of both solids are equal i.e. R = r
Since sphere is melted into cylinder i.e. volume remains same
⇒ 4/3 × 22/7 × r^3 = 22/7 × R^2 × h
⇒ h = 4r/3
⇒ required ratio = (4 × 22/7 × r^2) : (2 × 22/7 × R(R + h) = 2 × 3 : 7
⇒ required ratio = 6 : 7

10. Answer: (A)
$3952\frac{2}{3} = \frac{2}{3}\pi r^3 + \pi r^2 h$
(h = height of cylinder)
$\Rightarrow \frac{11858}{3} = \frac{2}{3} \times \frac{22}{7} \times 7 \times 7 \times 7 +$
$\frac{22}{7} \times 7 \times 7 \times h$
⇒ h = 21 cm.

11. Answer: (E)
$2\pi r^2 = 616$
$r^2 = \frac{616}{2} \times \frac{7}{22}$
$r^2 = 98$
∴ Volume = $\frac{2}{3}\pi r^3$
$= \frac{2}{3} \times \frac{22}{7} \times 98 \times 7\sqrt{2} = 2032.69\ cm^2$