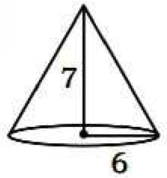
SOLUTIONS

1. (a)

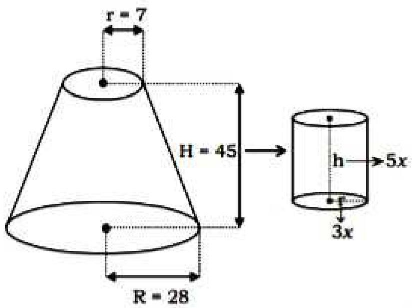


Volume of cone = $\frac{1}{3}\pi r^2 h$

$= \frac{1}{3}\times\frac{22}{7}\times 6\times 6\times 7$

$= 264\ cm^3$

2. (b)



Volume of frustum = Volume of cylinder

$\Rightarrow \frac{1}{3}\pi H\left(R^2 + Rr + r^2\right) = \pi r^2 h$

$\Rightarrow \frac{45}{3}\left[28^2 + (28\times 7) + 7^2\right] = 9x^2 \times 5x$

$\Rightarrow 784 + 196 + 49 = 3x^3$

$\Rightarrow 1029 = 3x^3$

$\Rightarrow x^3 = 343$

$\Rightarrow x = 7$

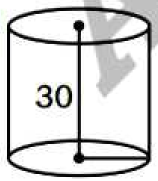
$\therefore$ radius of cylinder = 3 × 7 = 21

height of cylinder = 5 × 7 = 35

$\therefore$ C.S.A = $2\pi rh = 2\times\frac{22}{7}\times 21\times 35$

$= 4620\ cm^2$

3. (b)



Required T.S.A of painting solid right circular cylinder at the rate of Rs. 25/m² = $\frac{18425}{25} \Rightarrow 737\ m^2$

$\Rightarrow 2\pi r(r + h) = 737$

$\Rightarrow 2\times\frac{22}{7}\times r\,(r + 30) = 737$

$\Rightarrow r(30 + r) = \frac{67\times 7}{4} \Rightarrow \frac{7}{2}\times\frac{67}{2}$

$\Rightarrow r(30 + r) = \frac{7}{2}\left(30 + \frac{7}{2}\right)$

$\Rightarrow r = \frac{7}{2}$

$\therefore$ volume = $\pi r^2 h$

$= \frac{22}{7}\times\frac{7}{2}\times\frac{7}{2}\times 30$

$= 11 \times 7 \times 15$

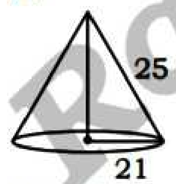
$= 1155\ m^3$

4. (c) T.S.A of hemisphere – C.S.A of hemisphere = $3\pi r^2 - 2\pi r^2 \Rightarrow \pi r^2$

$= \frac{22}{7}\times 2\times 2$

$= 4\pi\ cm^2$

5. (a)



Consider,

C.S.A of cone = $\pi rl \Rightarrow \frac{22}{7}\times 21\times 25$

$\Rightarrow 66 \times 25 = 1650$

$\therefore$ Cost of painting = 1.5 × 1650

= Rs.2475

6. (c) Given,

$r = 7$ cm, $l = 10$ cm

C.S.A of cone = πrl

$= \frac{22}{7}\times 7\times 10$

$= 220\ cm^2$

7. (d) Given,

$r = 7$ cm, $V = 196\pi\ cm^3$

Then,

$\frac{1}{3}\pi r^2 h = 196\pi$

$\frac{1}{3}\times 7\times 7\times h = 196$

h = 12 cm

8. (b) Given,

$r_1 = 12$, $r_2 = 4$ cm

Let 'n' number of solid hemisphere to be made

ATQ,

Volume of sphere = n × Valume of hemisphere

$\frac{4}{3}\times\pi\times r_1^3 = \frac{2}{3}\pi r_2^3 \times n$

$2\times 12\times 12\times 12 = 4\times 4\times 4\times n$

$54 = n$

9. (b) Volume of sphere = $\frac{4}{3}\pi r^3$

$\Rightarrow \frac{256}{3}\pi$

$r^3 = 64$

$r = 64$

T.S.A of sphere = $4\pi r^2$

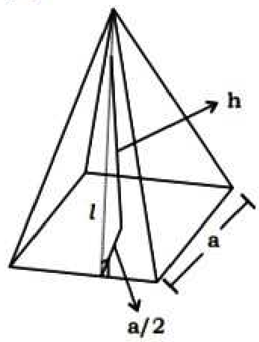
$= 4\times\pi\times 4\times 4 = 64\ \pi\ cm^2$

10. (c)

	Old	New
r	4	7
S.A $\propto r^2$	16	49

Required ratio = 49 : 16

11. (c)



$37.5\% = \frac{3}{8}$

Base area = $\frac{3}{8}\times 1536\ m^2 \Rightarrow 576\ m^2$

$\because$ Base of pyramid is a square

Then,

$a^2 = 576$

a = 24 m

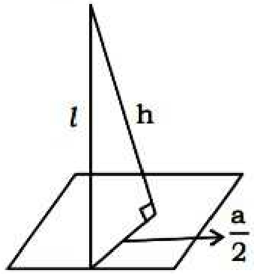
Now,

Area of remaing 4 triangle of pyramid or, leteral surface area of pyramid = 1536 – 576 ⇒ 960 m²

$4 \times \frac{1}{2} \times a \times l = 960$

$2 \times 24 \times l = 960 \Rightarrow l = 20$ m

Now,



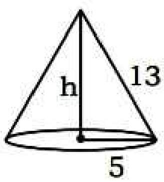
$h^2 + \frac{a^2}{4} = l^2 \Rightarrow h = 16$ m

$\therefore$ Volume of pyramid = $\frac{1}{3}$ × area of base × height

$= \frac{1}{3} \times a^2 \times h = \frac{1}{3} \times 576 \times 16$

$= 3072$ m³

12. (a)



Given,

$r = 5$ cm, $l = 13$ cm

$h = 12$ (pythagorean triplet)

Volume of cone $= \frac{1}{3}\pi r^2 h$

$= \frac{1}{3} \times \frac{22}{7} \times 5 \times 5 \times 12$

$= \frac{22}{7} \times 5 \times 20 = \frac{2200}{7} = 314.3$ cm³

13. (b) Given,

Volume of sphere = 130977

$\frac{4}{3}\pi r^3 = 130977$

$\frac{4}{3} \times \frac{22}{7} \times r^3 = 130977$

$r^3 = \frac{130977 \times 7 \times 3}{4 \times 22}$

$r^3 = \frac{11907 \times 21}{2 \times 4} \Rightarrow r = \frac{63}{2}$

Surface area of sphere = $4\pi r^2$

$\Rightarrow 4 \times \frac{22}{7} \times \frac{63}{2} \times \frac{63}{2}$

$= 22 \times 9 \times 63 = 12474$ cm²

14. (a)

	Old		New
$r \rightarrow$	2	:	1
$v \propto r^3 \rightarrow$	8	:	1

Reduced by $\frac{1}{8}$ by former volume.

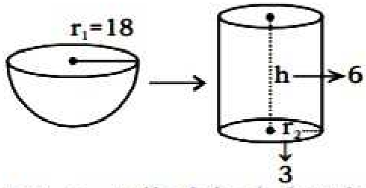
15. (c) Given,

Diameter of hemisphere = 36 cm

Radius of hemisphere (r_1) = 18 cm

Diameter of cylinder = 6 cm

Radius of cylinder (r_2) = 3 cm



Let n cylindrical bottle are required.

Then,

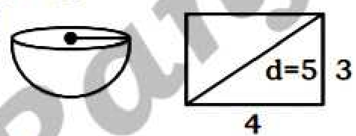
Volume of hemisphere = n × volume of cylinder

$\Rightarrow \frac{2}{3}\pi r_1^3 = n \times \pi r_2^2 \times h$

$\frac{2}{3} \times 18 \times 18 \times 18 = n \times 3 \times 3 \times 6$

$\Rightarrow n = 72$

16. (d)



ATQ,

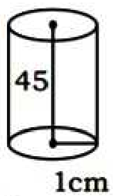
Diameter of hemisphere = diagonal of rectangle

$r = \frac{5}{2}$

T.S.A of hemisphere = $3\pi r^2$

$= 3 \times \pi \times \frac{5}{2} \times \frac{5}{2} = \frac{75\pi}{4}$

17. (d)



ATQ,

Volume of cylindrical metalic rod = Volume of wire

$\pi R^2 H = \pi r^2 h$

$\pi \times 1 \times 1 \times 45 = \pi \times r^2 \times 5 \times 100$

$r^2 = \frac{9}{100} \Rightarrow \boxed{0.3cm = r}$

diameter = 0.6 cm

= 6 mm

18. (b) Given,

Volume of sphere = 38808

$\frac{4}{3} \times \frac{22}{7} \times r^3 = 38808$

$r^3 = 441 \times 21$

$r = 21$

$\therefore$ S.A $= 4\pi r^2 = 4 \times \frac{22}{7} \times 21 \times 21$

$= 5544$ cm²

19. (d) Let,

$h = 12x$, $r = 5x$

Volume of cone $= \frac{1}{3}\pi r^2 h$

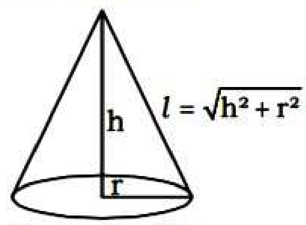
$v = \frac{1}{3} \times \frac{22}{7} \times r^2 \times h = 314$

$\Rightarrow \frac{1}{3} \times 3.14 \times 5 \times 5 \times 12 \times x^3 = 314$

$\Rightarrow x^3 = \frac{100 \times 3}{5 \times 5 \times 12} = 1$

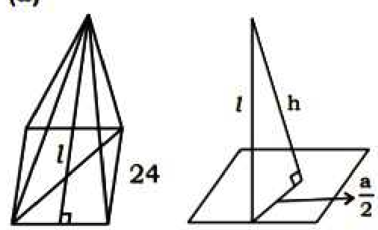
$\Rightarrow x = 1$

$\therefore r = 5, h = 12$



Hence, $l = 13$

20. (d)



$d = 24\sqrt{2}$

$\therefore$ side of square (a) = 24

Lateral surface area $= 4 \times \frac{1}{2} \times 24 \times l = 624$

$\Rightarrow l = \frac{624}{48} = 13$

Now, h = 5 cm [pythagoran triplet] (12, 13, 5)

$\therefore$ Volume of pyramid = $\frac{1}{3}$ × area of base × height

$= \frac{1}{3} \times a^2 \times h = \frac{1}{3} \times 24 \times 24 \times 5$

$= 24 \times 40 = 960$ cm³

21. (b) Given,

T.S.A of hemisphere = $3\pi r^2 = 4158$

$\Rightarrow r^2 = \frac{4158}{3\times22}\times7 \Rightarrow 63\times7$

$\Rightarrow r = 21$

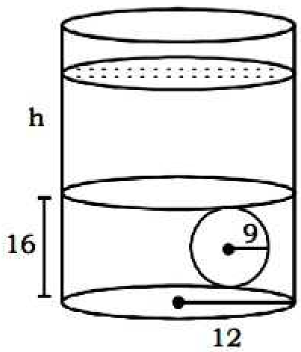
Volume of hemisphere = $\frac{2}{3}\pi r^3$

$= \frac{2}{3}\times\frac{22}{7}\times21\times21\times21$

$= 19404\ cm^3$

[solve by unit digit go through option]

22. (d)



Let, the rise in water level be h cm.

then, volume of sphere = Volume of water risen.

$\Rightarrow \frac{4}{3}\pi(9)^3 = \pi\times(12)^2\times h$

$h = \frac{4}{3}\times\frac{9\times9\times9}{12\times12}$

$h = \frac{27}{4} \Rightarrow 6.75$ cm

23. (d)

	Sphere		Hemisphere
S.A	$4\pi r_1^2$	=	$3\pi r_2^2$

$\Rightarrow \frac{r_1^2}{r_2^2} = \frac{3}{4} \Rightarrow \frac{r_1}{r_2} = \frac{\sqrt{3}}{2}$

$\therefore \frac{\frac{4}{3}\pi r_1^3}{\frac{2}{3}\pi r_2^3} = 2\times\frac{(\sqrt{3})^3}{(2)^3}$

$= \frac{3\sqrt{3}}{4} \Rightarrow 3\sqrt{3} : 4$

24. (c)

	P	Q
r	4	1
$v \propto r^3$	64	1

Required ratio = 64 : 1

25. (d) C.S.A of cylinder = $2\pi rh \Rightarrow 660$

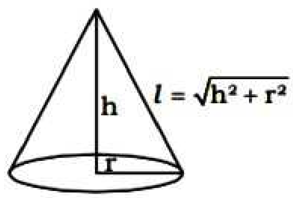
$\Rightarrow 2\times\frac{22}{7}\times r\times15 = 660 \Rightarrow r = 7$

$\therefore$ Volume of cylinder = $\frac{22}{7}\times7\times7\times15$

$= 22\times7\times15$

$= 11\times210 = 2310\ cm^3$

26. (c) T.S.A of cone = $\pi rl + \pi r^2 \Rightarrow \pi r(l + r)$

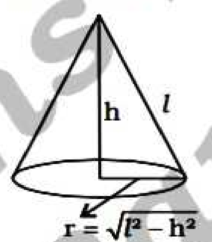


Now, $l = \sqrt{4^2+3^2} = 5$

$= \frac{22}{7}\times3\ (5+3)$

$= \frac{22\times24}{7} = \frac{528}{7}\ cm^2$

27. (c) Given,



$l = 29$ cm, h = 20 cm $\Rightarrow$ r = 21 cm

$\frac{\text{T.S.A of cone}}{\text{Volume of cone}} = \frac{\pi r(l+r)}{\frac{1}{3}\pi r^2h}$

$= \frac{21(29+21)}{\frac{1}{3}(441\times20)} \Rightarrow \frac{21\times50}{\frac{1}{3}\times441\times20}$

$= \frac{5}{14} \Rightarrow 5 : 14$

28. (b) Given,

$r_1 = 3$ cm , then $r_2 = \frac{3}{2}$ cm

ATQ,

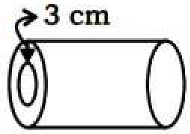
Volume of spherical ball = x × Volume of hemisphere

$\frac{4}{3}\pi3^3 = x\times\frac{2}{3}\times\pi\left(\frac{3}{2}\right)^3$

$\Rightarrow \frac{2\times27\times8}{27} = x$

$\Rightarrow x = 16$

29. (c)



Given,

R = 10 cm

h = 49 cm

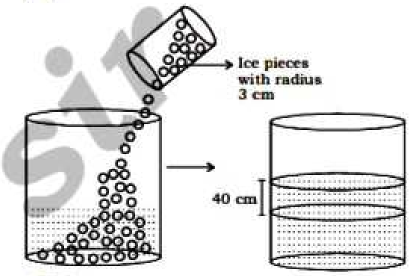
r = 10 – 3 = 7 cm

Volume of plastic = $\pi h\ [R^2 - r^2]$

$= \frac{22}{7}\times49\ [10^2 - 7^2] = 154\times3\times17$

$= 7854\ cm^3$

30. (a)



ATQ,

Let n Ice pieces are dropped

Volume of cylinder = n × Volume of spherical Ice pieces

$\pi\times9\times9\times40 = \frac{4}{3}\times\pi\times(3)^3\times n$

$\Rightarrow n = \frac{9\times9\times40\times3}{3\times3\times3\times4} = 90$

31. (a) Let n number of ball to be made

Then, Volume of sphere with radius 16 cm = n × Volume of sphere with radius 2 cm

$\frac{4}{3}\pi\times(16)^3 = n\times\frac{4}{3}\pi\times(2)^3$

$\frac{16\times16\times16}{2\times2\times2} = 2$

n = 512

32. (a) Total surface area of hemisphere = $3\pi r^2$

$= 3\pi\times\left(\sqrt{\frac{25}{\pi}}\right)^2 = 3\pi\times\frac{25}{\pi} = 75\ m^2$

33. (a) Given,

Ratio of height and base radius = 7 : 5

Volume of cylinder = πr^2h

$\Rightarrow 14836.5 = 3.14\times(5x)^2\times7x$

$\Rightarrow x^3 = \frac{14836.5}{3.14\times25\times7} = 27$

$\Rightarrow x = 3$

Hence, height = 21 cm and base radius = 15 cm

Total surface area = $2\pi r(r + h)$

$= 2 \times 3.14 \times 15(15 + 21)$

$= 2 \times 3.14 \times 15 \times 36 = 3391.2\ cm^2$

34. (c) Given, surface area of cube $= 54\ cm^2$

Surface area of cube = $6 \times (side)^2$

$\Rightarrow 54 = 6 \times (side)^2$

$\Rightarrow 9 = (side)^2$

$\Rightarrow$ side = 3 cm

Now,

Volume of cube = $(side)^3 = 27\ cm^3$

35. (d) Volume of hemisphere = $\frac{2}{3}\pi r^3$

$= \frac{2}{3} \times \frac{22}{7} \times 21 \times 21 \times 21 = 19404\ cm^3$

Hints: divisibility rule by 9

Hence, only option (d) is correct.

36. (b) Given,

Height of frustum, h = 18 cm

Large base radius of frustum, R = 25 cm

Small base radius frustum, r = 20 cm

Diameter of sphere = d = 2cm

Radius of sphere, r_{sphere} = 1 cm

Let the numbers of sphere be formed = n.

$\therefore$ Volume of frustum = n × volume of spheres

$\Rightarrow \frac{1}{3}\pi h\left(R^2 + r^2 + R.r\right) = n \times \frac{4}{3}\pi(r_{sphere})^3$

$\Rightarrow 18\ (25^2 + 20^2 + 25 \times 20) = n \times 4 \times (1)^3$

$\Rightarrow 18\ (625 + 400 + 500) = 4n$

$\Rightarrow n = 6862.5$

Required numbers of sphere = 6862

37. (d) Given,

Speed of flowing water = 18 km/h

Diameter of canal = 7 m

Radius of canal = $\frac{7}{2}$ cm

Distance covered in 30 minutes (9 km) will be considered as height.

h = 9000 m

Volume of water flowing through the canal in 30 minutes.

$= \pi r^2 h$

$= \frac{22}{7} \times \frac{7}{2} \times \frac{7}{2} \times 9000 = 346500 m^3$

38. (a) Given,

Diameter of hemisphere = 42 cm

radius, $r = \frac{42}{2} = 21cm$

Curved surface area of hemisphere $= 2\pi r^2$

$= 2 \times \frac{22}{7} \times 21 \times 21 = 2772\ cm^2$

Total surface area of hemisphere $= 3\pi r^2$

$= 3 \times \frac{22}{7} \times 21 \times 21 = 4158\ cm^2$

39. (c) C.S.A of Hemisphere = $2\pi r^2$

$= 2 \times \frac{22}{7} \times 21 \times 21 = 2772\ cm^2$

75% of CSA = $\frac{2772 \times 75}{100}$

$= 2080\ cm^2$ (Approx)

40. (a) Total Surface area of hemisphere = $3\pi r^2$

$\Rightarrow 462 = 3 \times \frac{22}{7} \times r^2$

$\Rightarrow 462 \times 7 = 22 \times 3 \times r^2$

$\Rightarrow r^2 = \frac{462 \times 7}{22 \times 3} = 49$

$\Rightarrow r = 7$ cm

A.T.Q,

The hemisphere is converted into cones.

Volume of hemisphere = volume of Cone

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

$\Rightarrow \frac{2}{3}\pi 7^3 = \frac{1}{3}\pi 7^2 h$

$\Rightarrow 14 = h$

Height of the cone = 14 cm.

41. (c) Number of Metallic Spheres

$= \frac{\text{Volume of Cylinder}}{\text{Volume of Sphere}} = \frac{\pi R^2 H}{\frac{4}{3}\pi r^3}$

$= \frac{3R^2 H}{4r^3} = \frac{3 \times 4 \times 4 \times 18}{4 \times 3 \times 3 \times 3} = 8$

42. (c) Let the breadth of the wall be x, height be $6x$ and length be $3x$.

Volume = Length × Breadth × Height

$\Rightarrow 23958 = 3x \times x \times 6x$

$\Rightarrow x^3 = \frac{23958}{18} = 1331$

$\Rightarrow x = 11$

Thus, breadth of the wall is 11 cm.

43. (c) TSA of cuboid

$= 2(lb + bh + hl)$

$= 2\ (7 \times 5 + 5 \times 9 + 9 \times 7)$

$= 2\ (35 + 45 + 63) = 2 \times 143$

$= 286\ cm^2$

44. (d) Let breadth = x

then length = $5x$

Area of four walls = $2(l + b)h$

$\Rightarrow 2(5x + x)8 = 720$ m

$\Rightarrow 96x = 720$ m

$\Rightarrow x = 7.5$ m

$\therefore$ Breadth = 7.5 m and Length = 37.5 m

TSA of cold Storage = $2(lb + bh + hl)$

$= 2(37.5 \times 7.5 + 7.5 \times 8 + 8 \times 37.5)$

$= 2(281.25 + 60 + 300)$

$= 2 \times 641.25$

$= 1282.5\ m^2$

45. (d) Volume of cone = Volume of all three sphere

$\Rightarrow \frac{1}{3}\pi R^2 h = \frac{4}{3}\pi\left(r_1^3 + r_2^3 + r_3^3\right)$

$\Rightarrow R^2 h = 4\left(r_1^3 + r_2^3 + r_3^3\right)$

$\Rightarrow 12^2 h = 4(10^3 + 8^3 + 6^3)$

$\Rightarrow 144h = 4(1000 + 512 + 216)$

$\Rightarrow h = \frac{4 \times 1728}{144} = 48$

Slant height, $l = \sqrt{12^2 + 48^2}$

$= \sqrt{144 + 2304}$

$= \sqrt{2448} = 49.48$

CSA of cone = $\pi R l$

$= 3.14 \times 12 \times 49.48 = 1864.4064$

$= 1864.41 cm^2$

46. (a) Here, The cylinder is converted into 3 cones of the same height radius.

So their, volume will be equal.

Volume of cylinder = 3 × volume of cones

$l = \sqrt{6^2 + 8^2} = \sqrt{36 + 64}$

$= \sqrt{100} = 10\ cm^2$

CSA of all three cones = $3 \times \pi r l$

$= 3 \times \pi \times 6 \times 10 = 180\pi\ cm^2$

47. (c) $h_1 : h_2 = 1 : 5$
$P_1 : P_2 = 5 : 3$
$r_1 : r_2 = P_1 : P_2 = 5 : 3$
$\frac{V1}{V2} = \frac{r_1^2 h_1}{r_2^2 h_2}$
$= \frac{25 \times 1}{9 \times 5} = \frac{5}{9}$
Thus, ratio of their volume
= 5 : 9

48. (d) Volume of cone $= \frac{1}{3}\pi r^2 h$
$= \frac{1}{3} \times 3.14 \times 7 \times 7 \times 9$
= 461.58 cubic feet

49. (b) Capacity of the tank = 64π liter
Volume = $64\pi \times 1000\ cm^3$
$\Rightarrow$ Volume of tank = $\pi^2 h$
$\Rightarrow 64\pi \times 1000 = \pi r^2 h$
$\Rightarrow 64000 = r^2 h$
As, r = h
$\therefore r^3 = 64000$
$\Rightarrow r = 40$ cm

50. (d) Radius of Hemispherical Bowl
$R = \frac{18}{2} = 9$ cm
Radius of Cylinderical Bottle
$r = \frac{6}{2} = 3$ cm
Height of Cylinderical Bottle
h = 3 cm
No. of required Bottles
$= \frac{\text{Volume of bowl}}{\text{Volume of bottle}}$
$= \frac{\frac{2}{3}\pi R^3}{\pi r^2 h} = \frac{2R^3}{3r^2 h} = \frac{2 \times 9 \times 9 \times 9}{3 \times 3 \times 3 \times 3} = 18$

51. (c) Area of the base of cone = 616
$\Rightarrow \pi r^2 = 616$
$\Rightarrow \frac{22}{7} \times r^2 = 616$
$\Rightarrow r^2 = \frac{616 \times 7}{22}$
$\Rightarrow r = 14$ cm
Total surface area of the cone
$= \pi r(l + r)$
$= \frac{22}{7} \times 14(20 + 14) = 44 \times 34$
$= 1496\ cm^2$

52. (d) Given,
Radius of hemispherical bowl
R = 3 cm
Radius of cylindrical bottle
$r = \frac{2}{2} = 1cm$
Height of cylindrical bottle
h = 4 cm
No. of required bottles
$= \frac{\text{Volume of bowl}}{\text{Volume of bottle}}$
$= \frac{\frac{2}{3}\pi R^3}{\pi r^2 h} = \frac{2R^3}{3r^2 h}$
$= \frac{2 \times 6 \times 6 \times 6}{3 \times 1 \times 1 \times 1 \times 4} = 36$

53. (a) Let the other parallel sides be l.
Area of trapezium
$\frac{1}{2}$ (Some of parallel sides) × h
$\Rightarrow 1785 = \frac{1}{2} \times (42 + l) \times 35$
$\Rightarrow 42 + l = \frac{1785 \times 2}{35}$
$\Rightarrow 42 + l = 102$
$\Rightarrow l = 102 - 42 = 60$ feet
Thus, the length of the other parallel sides = 60 feet.

54. (a) TSA of cone = $\pi r l + \pi r^2$
CSA of cone = $\pi r l$
$\therefore$ TSA – CSA = πr^2
$= \frac{22}{7} \times 35 \times 35 = 3850\ cm^2$

55. (a) Base area of cone = πr^2
$\Rightarrow 154 = \frac{22}{7} \times r^2$
$\Rightarrow r = 7$ cm
Again, curved surface area of cone = 550
$\Rightarrow \pi r l = 550$
$\Rightarrow \frac{22}{7} \times 7 \times l = 550$
$\Rightarrow l = \frac{550}{22} = 25$ cm
$h = \sqrt{l^2 - r^2}$
$= \sqrt{25^2 - 7^2} = \sqrt{625 - 49} = \sqrt{576}$
= 24 cm
Volume of cone $= \frac{1}{3} \times \pi r^2 h$
$= \frac{1}{3} \times \frac{22}{7} \times 7 \times 7 \times 24 = 1232\ cm^3$

56. (b) Total surface area of cylinder
$= 2\pi r(r + h)$
$= 2 \times \frac{22}{7} \times 7(7 + 8) = 660\ cm^2$

57. (a) Surface Area of sphere = $4\pi r^2$
$= 4\pi(5)^2 = 100\pi\ cm^2$

58. (c) Given,
Curved surface area of cylinder
$= 2200\ cm^2$
Perimeter of base, $2\pi r$ = 110 cm
ATQ, CSA of cylinder = $2\pi rh$
$\Rightarrow 2200 = 110 \times h$
$\Rightarrow h = 20$ cm
Thus, height of the cylinder = 20 cm

59. (a) CSA of cylinder = $2\pi rh$
$\Rightarrow 1386 = 2 \times \frac{22}{7} \times r \times 21$
$\Rightarrow r = \frac{1386 \times 7}{44 \times 21} = 10.5$ cm

60. (d) CSA of cylinder = $2\pi rh$
$\Rightarrow 70\pi = 2\pi r \times 7$
$\Rightarrow r = 5$
TSA of cylinder = $2\pi r(r + h)$
$= 2\pi \times 5(5 + 7)$
$= 120\pi\ cm^2$

61. (b) Net change in area
$= \left(10 + 10 + \frac{10 \times 10}{100}\right)\% = 21\%$

62. (d) Radius = 14cm
Curved surface area = 880 cm^2
$\because 2\pi rh = 880$ (h = height of cylinder)
$= \frac{880 \times 7}{2 \times 22 \times 14}$
h = 10 cm
Volume = $\pi r^2 h$
$= \frac{22}{7} \times 14 \times 14 \times 10$
$= 6160\ cm^3$

63. (c) Volume of cube = $a^3 = 729\ cm^3$
Volume of cuboid
$= 5 \times 13 \times 31 = 2015\ cm^3$
Total volume
$= 2015 + 729 = 2744\ cm^3$
Volume of new cube (A^3) = 2744
A = 14 cm
Total surface area of new cube
$= 6A^2$
$= 6 \times 14^2$
$= 1176\ cm^2$

64. (a) One revolution of wheel = $2\pi r$
12 revolution of wheel = $12 \times 2 \times \frac{22}{7} \times 21$ ($\because 2r = 42$ cm)
$= 72 \times 22 = 1584$ cm = 15.84 m

65. (c) $\because \frac{4\pi r^2}{\frac{4}{3}\pi r^3} = \frac{2}{7}$

$r = \frac{21}{2}$
r = 10.5 cm

66. (b) $x \times \frac{4}{3}\pi \times (2)^3 = \frac{4}{3}\pi \times (11)^3$

$x = \frac{11^3}{2^3} = 166$

67. (c) Volume of cube = $9^3 = 729$ cm³
Volume of cuboid
$= 5 \times 13 \times 31 = 2015$ cm³
Taken = 729 + 2015
= 2744 cm³
Volume of new cube (a^3)
= 2744
a = 14 cm
Total surface area of new cube
$= 6a^2 = 6 \times 196 = 1176$ cm²
Total cost of polish of a new cube
$= 1176 \times 10 =$ Rs. 11760

68. (a) Total area of room
$= 2(l + b) \times h + lb$
$= 2(12 + 8) \times 10 + 12 \times 8$
= 400 + 96 = 496 cm²
Total cost
$= 496 \times 25 =$ Rs. 12400

69. (a) Volume of cylinder = $\pi r^2 h$
$\frac{22}{7} \times 14 \times 14 \times h = 6160$
[$\because$ r = 14 cm]
$h = \frac{6160 \times 7}{14 \times 14 \times 22}$
h = 10 cm
Curved surface area = $2\pi rh$
$= 2 \times \frac{22}{7} \times 14 \times 10 = 880$ cm²

70. (c) Volume of a sphere = $\frac{4}{3}\pi r^3$
$\frac{4}{3}\pi r^3 = 4851$
$r^3 = \frac{4851 \times 7 \times 3}{4 \times 22}$
$r^3 = \frac{441 \times 21}{8}$
$r = \frac{21}{2}$ cm
Area of a sphere = $4\pi r^2$
$= 4 \times \frac{22}{7} \times \frac{21}{2} \times \frac{21}{2} = 1386$ cm²

71. (c) Both cylinders capacity volume equal.
$2r_1 : 2r_2 = 1 : 4$
$r_1 : r_2 = \frac{1}{2} : 2$
$\frac{\pi r_1^2 h_1}{\pi r_2^2 h_2} = \frac{1}{1}$
$\frac{h_1}{h_2} = \frac{r_2^2}{r_1^2} = \frac{(2)^2}{\left(\frac{1}{2}\right)^2} = \frac{16}{1}$
$h_1 : h_2 = 16 : 1$

72. (c) Total area of 4 walls
$= 2(l + b) \times h$
$= 2(12 + 8) \times 10$
= 400 cm²
Total cost
$= 400 \times 25 =$ Rs. 10000

73. (a) Diameter = 84cm (given)
Radius = 42
One revolution = $2\pi r$
Wheel go in 16 revolutions
$= 2 \times \frac{22}{7} \times 42 \times 16$
= 4224 cm = 42.24m

74. (b) h = 35 cm (given)
$\pi r l = 4\pi r^2$
$l = 4r$
$l^2 = h^2 + r^2$
$(4r)^2 = (35)^2 + r^2$
$16r^2 = 1225 + r^2$
$15r^2 = 1225$
$r^2 = \frac{1225}{15}$
Volume of cone
$\Rightarrow \frac{1}{3}\pi r^2 h = \frac{1}{3} \times \frac{22}{7} \times \frac{1225}{15} \times 35$
$= 2994 \text{ cm}^3 = \frac{2994}{10^6 \text{ m}^3}$
$= 2994 \times 10 - 6$ m³ $= 2.994 \times 10^{-3}$ m³

75. (c) 60 disc each of diameter 21cm
Thickness = $\frac{1}{3}$ cm
Radius = $\frac{21}{2} = 10.5$ cm
Height = $60 \times \frac{1}{3} = 20$cm
Volume of cylinder = $\pi r^2 h$
$= \frac{22}{7} \times 10.5 \times 10.5 \times 20$
$= 693 \text{ cm}^3 = 6.93 \times 10^{-3}$ m³
Note : In this question,
We can check the divisibiling of (11 and 7)
So, its only (6.93×10^{-3} m³) is divisible by both (11 and 7)

76. (c) Height of cylinder = 84 cm
External Radius of cylinder
$= \frac{10}{2} = 5$cm
Internal radius of cylinder
$= \frac{8}{2} = 4$cm
We know,
Volume of the cylinder
$= \pi(R^2 - r^2)h$
$= \pi(5^2 - 4^2) \times 84$
$= \pi \times 9 \times 84 = 2376$ cm³
$= 2.376 \times 10^{-3}$ m³

77. (b)
T.S.A = $2\pi r(r + h)$
C.S.A = $2\pi rh$
Given,
$\frac{2\pi r(r+h)}{2\pi rh} = \frac{3}{1}$
$= r + h = 3h$
$= r = 2h = h = \frac{r}{2}$
$= 2\pi r(r + h) = 1848$
$= 2 \times \frac{22}{7} \times r\left(r + \frac{r}{2}\right) = 1848$
$= 2 \times \frac{22}{7} \times r \times \frac{3r}{2} = 1848$
$= r^2 = 196 = r = 14$ cm
$h = \frac{r}{2} = \frac{14}{2} = 7$ cm
Volume of cylinder
$= \pi r^2 h = \frac{22}{7} \times 14 \times 14 \times 7$
= 4312 cm³

78. (b) R = 8cm
h = 15cm
$l^2 = r^2 + h^2$
$l^2 = 64 + 225$
$l = 17$ cm
Total surface area of cone
$= \pi r(r + l)$
$= \pi \times 8(8 + 17)$
$= \pi \times 8 \times 25$
$= 200\pi$

79. (d) A.T.Q,

$\frac{4}{3}\pi r^3 = \pi r^2 h$

$\frac{4}{3} \times \frac{84 \times 84 \times 84}{1000} = 12 \times 12 \times h$

$= h = \frac{49 \times 84}{250}$

$= h = 5.488 \approx 5.5$ cm

80. (b) Radius $= \frac{30}{2} = 15$cm

$\frac{1}{3}\pi r^2 h = 600\pi$

$\frac{1}{3} \times 15 \times 15 \times h = 600$

h = 8
R = 15
$l = +\sqrt{(15)^2(8)^2} = \sqrt{225+64} = \sqrt{289}$
= 17 cm
T.S.A of cone $= \pi r(r + l)$
$= \pi \times 15\ (15 + 17)$
$= \pi \times 15 \times 32 = 480\pi\ cm^2$

81. (c) $3\pi r^2 = 1039.5$

$= 3 \times \frac{22}{7} \times r^2 = 1039.5$

$r = \frac{21}{2} = 10.5$ cm

Volume of Hemisphere

$= \frac{2}{3} \times \frac{22}{7} \times 10.5 \times 10.5 \times 10.5$

$= 2425.5\ cm^3$

82. (a) $\frac{4}{3}\pi x^3 = 126 \times \frac{1}{3}\pi \times 3.5 \times 3.5 \times 3$

$= x^3 = \frac{63 \times 49 \times 3}{8} = \frac{9261}{8}$

$x = \frac{21}{2} = 10.5$ cm

83. (c) Volume of sphere $= \frac{4}{3}\pi r^3$

Volume of cone $= \frac{1}{3}\pi r^2 h$

$= \frac{4}{3} \times \pi \times 6.3 \times 6.3 \times 6.3$

$= \frac{1}{3}\pi \times r^2 \times 25.2$

$= r = \frac{63}{10} = 6.3$, Diameter
$= 6.3 \times 2 = 12.6$ cm
Required ratio = 12.6 : 25.2
= 1 : 2

84. (a) Volume of cylinder $= \pi r^2 h$
Ratio of radius of base and height
$= 2x : 3x$
$\pi r^2 h = 202.125\ cm^3$

$\frac{22}{7} \times 2x \times 2x \times 3x = 202.125$

$= x^3 = \frac{202.125 \times 7}{2 \times 2 \times 3 \times 22}$

$x = 1.75$
Radius of cylinder $= 2 \times 1.75 = 3.5$
Height of cylinder $= 3 \times 1.75 = 5.25$
Total surface area of cylinder

$= 2\pi r(r + h) = 2 \times \frac{22}{7} \times 3.5\ (3.5 + 5.25)$

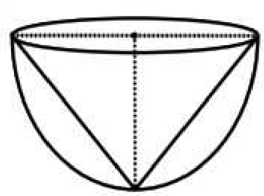
$= 2 \times \frac{22}{7} \times 3.5 \times 8.75 = 192.5\ cm^2$

85. (c) Radius of cone = R = 12 cm
Curved surface area of cone $= \pi rl$
$= \pi rl = 156\pi$
$= 12 \times l = 156$
$= l = 13$
$l^2 = r^2 + h^2$
$169 = 144 + h^2$
h = 5

Volume of cone $= \frac{1}{3} \times \pi \times r^2 \times h$

$= \frac{1}{3} \times \pi \times 12 \times 12 \times 5 = 240\pi\ cm^3$

86. (a)



Volume of cone $= \frac{1}{3}\pi r^2 h$

Volume of hemisphere $= \frac{2}{3}\pi r^3$

The radius of the cone and hemisphere be r cm
Height of cone = r

Volume of cone $= \frac{1}{3}\pi r^2 \times r = \frac{1}{3}\pi r^3$

Volume of hemisphere $= \frac{2}{3}\pi r^3$

Remaining volume $= \frac{2}{3}\pi r^3 - \frac{1}{3}\pi r^3$

$= \frac{1}{3}\pi r^3$

Required % $= \frac{\frac{1}{3}\pi r^3}{\frac{2}{3}\pi r^3} \times 100 = 50\%$

87. (a) Volume of cylinder $= \pi r^2 h$

$\Rightarrow \frac{22}{7} \times r^2 \times 34 = 5236$

$\Rightarrow r = 7$
C.S.A of cylinder $= 2\pi rh$

$\Rightarrow 2 \times \frac{22}{7} \times 7 \times 34 = 1496\ cm^2$

88. (b) ATQ,

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

$\Rightarrow \frac{1}{3}\pi \times 18 \times 18 \times 60 = \pi \times 15 \times 15 \times h$

$\Rightarrow \frac{1}{3} \times 18 \times 18 \times 60 = 15 \times 15 \times h$

$\Rightarrow h = 28.8$ cm

89. (b) Volume of tank = 25000 litres
As we know,
1000 litres = $1m^3$
Let the length of the tank be x m

Depth of tank $= x \times \frac{1}{5} = \frac{x}{5}$

Breadth of tank $= x \times \frac{1}{8} = \frac{x}{8}$

Volume of cuboid = L × B × H

$\Rightarrow x \times \frac{x}{5} \times \frac{x}{8} = 25$

$\Rightarrow x^3 = 5^3 \times 2^3$
$\Rightarrow x = 10$m (length of tank)

90. (b) Length = 88 cm
Width = 11 cm
Height of cylinder = 11 cm
Length will be the circuler base of cylinder, So-
$\Rightarrow 2\pi r = 88$
$\Rightarrow r = 14$ cm
Volume of cylinder = $\pi r^2 h$

$\Rightarrow \frac{22}{7} \times 14 \times 14 \times 11 = 6776\ cm^3$

91. (b) **Formula Used:**

Volume of hemisphere = $\frac{2}{3}\pi r^3$

Volume of cylinder = $\pi r^2 h$
Given,
Diameter = 7 cm
Height = 28 cm
ATQ,
12 × The volume of a hemisphere
⇒ The volume of a cylinder

$\Rightarrow 12 \times \frac{2}{3} \times \pi r^3 = \pi \times R^2 h$

$\Rightarrow r^3 = \frac{7}{2} \times \frac{7}{2} \times 28 \times \frac{1}{8}$

$\Rightarrow r^3 = \frac{7 \times 7 \times 7}{8} = \left(\frac{7}{2}\right)^3$

$\Rightarrow r = \frac{7}{2} = 3.5$ cm

92. (b) Volume of cube = a^3
Radius of cylinder = a/2, Height = a
Volume of cylinder = $\pi r^2 h$

$= \pi \times \frac{a^2}{4} \times a = 3.14 \times \frac{a^3}{4}$

$= 0.785\ a^3$
Remaining volume of cube
$= a^3 - 0.785\ a^3 = 0.215\ a^3$

Required % $= \frac{0.215a^3}{a^3} \times 100\%$
$= 21.5\%$

93. (d)
Radius : Height
10x: 24x
5x : 12x

$l = \sqrt{(12x)^2 + (5x)^2} = \sqrt{169x^2} = 13x$

Curved surface area = πl

$\Rightarrow \frac{22}{7} \times 5x \times 13x = 2502.5$

$\Rightarrow x^2 = \frac{2502.5 \times 7}{22 \times 5 \times 13} = 12.25$

$\Rightarrow x = 3.5 = \frac{7}{2}$ cm

We know, Volume of cone = $\frac{1}{3}\pi r^2 h$

$= \frac{1}{3} \times \frac{22}{7} \times 5x \times 5x \times 12x$

$= \frac{1}{3} \times \frac{22}{7} \times 5 \times \frac{7}{2} \times 5 \times \frac{7}{2} \times 12 \times \frac{7}{2}$

$= 13475\ cm^3$

94. (c) Given,
Radius of the Sphere = 4 cm.
Let the radius of the cylinder be 3x.
Height of the cylinder

$= 2 \times 3x \times \frac{2}{3} = 4x.$

A.T.Q,
Volume of cylinder = Volume of sphere

$\Rightarrow \pi r^2 h = \frac{4}{3}\pi r^3$

$\Rightarrow 3x \times 3x \times 4x = \frac{4}{3} \times 4 \times 4 \times 4$

$\Rightarrow x = \frac{4}{3}$

We know,
Curved surface of cylinder = $2\pi rh$
$= 2 \times \pi \times (3x) \times (4x)$

$= 2 \times \pi \times 3 \times \frac{4}{3} \times 4 \times \frac{4}{3}$

$= \frac{128}{3}\pi\ cm^2$

95. (a) Volume of cylinder = $\pi r^2 h$
Let the radius ratio of two cylinder be $\frac{r_1}{r_2}$, Volume ratio of two cylinder $\frac{V_1}{V_2} = \frac{x}{y}$ & Height ratio of two cylinder $\frac{h_1}{h_2} = \frac{a}{b}$.

Now, $\frac{V_1}{V_2} = \frac{\pi(r_1)^2 h_1}{\pi(r_2)^2 h_2}$

$\Rightarrow \frac{x}{y} = \frac{(r_1)^2 a}{(r_2)^2 b}$

$\Rightarrow \frac{r_1}{r_1} = \sqrt{\frac{xb}{ya}}$

96. (a) Length and breadth of a cuboidal store = 2x : x

Height of the cuboidal store (h) = 3.5m

Area of four wall = $2(l + b) \times h$

$\Rightarrow 2(l + b) \times h = 210$

$\Rightarrow 2(2x + x) \times 3.5 = 210$

$\Rightarrow 3x = 30$

$\Rightarrow x = 10$

Volume of cuboidal store = $l \times b \times h$

$= 2x \times x \times 3.5$

$= 7 \times 10 \times 10$

$= 700\ m^3$

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