SURFACE AREAS AND VOLUMES

MCQs & A and R WORK SHEET

Test / Exam Name: Surface Areas And Volumes **Standard: 10th** **Subject: Mathematics**

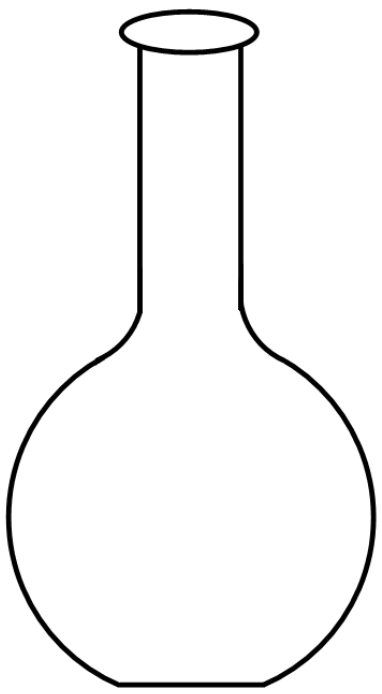
Student Name: ..... **Section:** ..... **Roll No.:** .....

Questions: 40 **Time: 01:00 hh:mm** **Negative Marks: 0** **Marks: 40**

Instructions

1. MULTIPLE CHOICE QUESTIONS.

Q1. A surahi is a combination of: **1 Mark**



Surahi

A A sphere and a cylinder. **B** A hemisphere and a cylinder. **C** A cylinder and a cone.
D Two hemispheres.

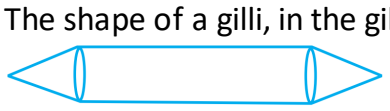
Ans: **A** A sphere and a cylinder.

Solution:

A surahi is a combination of a sphere and a cylinder, the lower portion is the sphere and the upper portion is the cylinder.

Q2. Choose the correct answer from the given four options: **1 Mark**

The shape of a gilli, in the gilli-danda game see Fig. is a combination of:

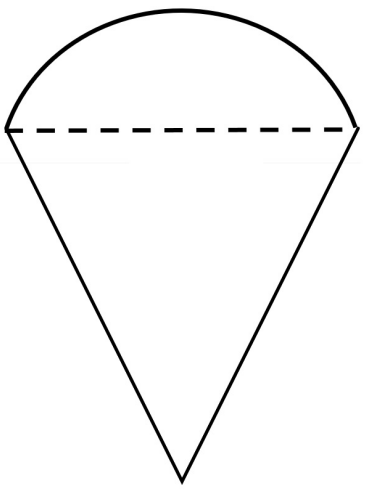


A Two cylinders. **B** A cone and a cylinder. **C** Two cones and a cylinder. **D** Two cylinders and a cone.

Ans: Solution:

= Cone + Cylinder + Cone
=Two cones and a cylinder

Q3. A plumbline (sahul) is the combination of: **1 Mark**



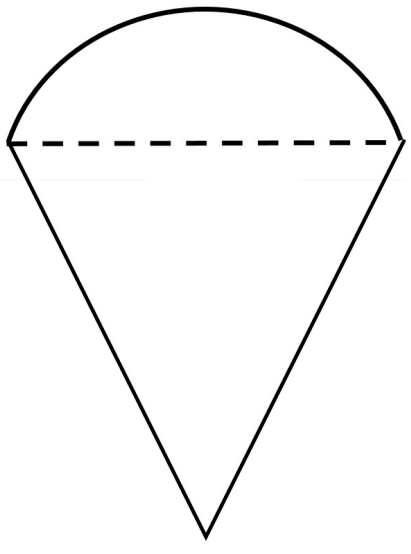
1. A hemisphere and a cylinder
2. A hemisphere and a cone
3. A sphere and a cylinder
4. A cone and a cylinder

A A hemisphere and a cylinder **B** A hemisphere and a cone **C** A sphere and a cylinder
D A cone and a cylinder

Ans: **B** A hemisphere and a cone

Solution:

A plumb line is a combination of a hemisphere and a cone



Q4.A shoe box is a 15cm long, 10cm broad and 9cm high. The volume of the box is: **1 Mark**

A 1500 cu. cm **B** 1200 cu. cm **C** 1000 cu. cm **D** 1350 cu. cm

Ans: D 1350 cu. cm

4. 1350 cu. Cm

Solution

The volume of cuboid = l × b × h

= 15 × 10 × 9

= 1350 cu. Cm

Q5. In a right circular cone, the cross-section made by a plane parallel to the base is a: **1 Mark**

A Circle. **B** Frustum of a cone. **C** Sphere. **D** Hemisphere.

Ans: A Circle.

Solution:

When a plane parallel to the base of a cone cuts it, then a frustum and a smaller cone is formed.

The cross-section thus formed will be a circle.

Hence, the correct answer is option.

Q6. Volumes of two spheres are in the ratio 64 : 27. The ratio of their surface areas is: **1 Mark**

A 3 : 4 **B** 4 : 3 **C** 9 : 16 **D** 16 : 9

Ans: D 16 : 9

Solution:

Let the radii of the two sphere are r_1 and r_2 respectively

∴ Volume of the sphere of radius, $r_1 = v_1$

$= \frac{4}{3}\pi r_1^3 \ldots (1)$

[∵ Volume of sphere $= \frac{4}{3}\pi(\text{radius})^3$]

and volume of the sohere of radius,

$r_2 = v_2 = \frac{4}{3}\pi r_2^3 \ldots (2)$

Given, ratio of volume = $V_1 : V_2$

$= 64 : 27 \Rightarrow \frac{\frac{4}{3}\pi r_1^3}{\frac{4}{3}\pi r_2^3} = \frac{64}{27}$

[using eqs. (1) and (2)]

$\Rightarrow \frac{r_1^3}{r_2^3} = \frac{64}{27} \Rightarrow \frac{r_1}{r_2} = \frac{4}{3} \ldots (3)$

Now, ratio of surface area $= \frac{4\pi r_1^2}{4\pi r_2^2}$

[∵ surface area of a sphere $= 4\pi$ (radius)^2]

$= \frac{r_1^2}{r_2^2}$

$= \left(\frac{r^1}{r^2}\right)^2 = \left(\frac{4}{3}\right)^2$ [using eq. (3)]

= 16 : 9

Hence, the required ratio of their surface area is 16 : 9.

Q7. The radius of a sphere (in cm) whose volume is $12\pi\ \text{cm}^3$, is: **1 Mark**

A 3 **B** $3\sqrt{3}$ **C** $3^{\frac{2}{3}}$ **D** $3^{\frac{1}{3}}$

Ans: C $3^{\frac{2}{3}}$

Solution:

The volume of a sphere $= 12\pi\text{cm}^3$

Let the radius of a sphere = r

To find, the radius of a sphere (r) = ?

We know that,

The volume of a sphere $= \frac{4}{3}\pi r^3$

According to question,

$\therefore \frac{4}{3}\pi r^3 = 12\pi$

$\Rightarrow r^3 = \frac{12\times 3}{4}$

$\Rightarrow r^3 = \frac{36}{4}$

$\Rightarrow r^3 = 9$

$\Rightarrow r = (3^2)^{\frac{1}{3}}$

Using the identity,

$(a^m)^n = a^{mn}$

$\Rightarrow r = 3^{\frac{2}{3}}cm$

$\therefore$ The radius of a sphere $(r) = 3^{\frac{2}{3}}cm$

Thus, the radius of a sphere $(r) = 3^{\frac{2}{3}}cm$

Q8. The volume of a cube is 2744cm^2. Its surface area is: **1 Mark**

A 196cm^2 **B** 1176cm^2 **C** 784cm^2 **D** 588cm^2

Ans: B 1176cm^2

Solution:

Let the edge of the cube be x cm.

Volume of a cube = x^3

? $2744 = x^3$

? x = 14cm

So, the surface area of the cube = $6x^2$

$= 6(14)^2$

$= 1176cm^2$

Q9. The length of the longest pole that can be kept in a room (12m × 9m ×8m) is: **1 Mark**

A 29m **B** 21m **C** 19m **D** 17m

Ans: D 17m

Solution:

Lenght of the longest pole that can that can be kept in a room

= Lenght of the diagonal of the room

$= \sqrt{l^2 + b^2 + h^2}$

$= \sqrt{12^2 + 9^2 + 8^2}$

$= \sqrt{289}$

$= 17m$

Q10. The radii of two cylinders are in the ratio 2 : 3 and their heights are in the ratio 5 : 3. The ratio of their volumes is: **1 Mark**

A 27 : 20 **B** 20 : 27 **C** 4 : 9 **D** 9 : 4

Ans: B 20 : 27

Solution:

Let the radii of the two cylinders be 2x and 3x,

and the heights of the two cylinders be 5y and 3y respectively

Ratio of the volume of the cylinders $= \frac{\pi(2x)^2(5y)}{\pi(3x)^2(3y)}$

$= \frac{20}{27}$

That is, the ratio of their volume is 20 : 27.

Q11. A solid is hemispherical at the bottom and conical above. If the surface areas of the two parts are equal, then the ratio of its radius and the height of its conical part is: **1 Mark**

A $1:3$ **B** $1:\sqrt{3}$ **C** $1:1$ **D** $\sqrt{3}:1$

Ans: B $1:\sqrt{3}$

2. $1:\sqrt{3}$

solution:

Surface area of hemispherical part = surface area of conical part

$\Rightarrow 2\pi r^2 = \pi rl \Rightarrow 2rl$

$\Rightarrow 2r = \sqrt{r^2 + h^2} \Rightarrow 4r^2 = r^2 + h^2$

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

$\Rightarrow \frac{r}{h} = \frac{1}{\sqrt{3}}$

$\therefore \text{Roots} = 1 : \sqrt{3}$

Q12. A solid is hemispherical at the bottom and conical (of same radius) above it. If the surface areas of the two parts are equal, then the ratio of its radius and the slant height of the conical part is: **1 Mark**

A 1 : 2 **B** 2 : 1 **C** 1 : 4 **D** 4 : 1

Ans: A 1 : 2

Solution:

Given that the radius of the hemisphere and the cone are equal.

Since the surface of the two parts are given to be equal.

$2\pi r^2 = \pi rl$

$\Rightarrow 2r = l$

$\Rightarrow \frac{r}{l} = \frac{1}{2}$

So, the ratio 1: 2

Q13. If the radius of the base of a right circular cylinder is halved, keeping the height the same, then the ratio of the volume of the cylinder thus obtained to the volume of original cylinder is: **1 Mark**

A 1 : 2 **B** 2 : 1 **C** 1 : 4 **D** 4 : 1

Ans: C 1 : 4

Solution:

Let the radius of the original cylinder = r

And its height = h

Now the radius of the reduced cylinder $= \frac{r}{2}$ and height = h

$\therefore \frac{\text{Volume of the reduced cylinder}}{\text{Volume of the original cylinder}} = \frac{\pi\left(\frac{r}{2}\right)^2 \times h}{\pi r^2 h} = \frac{1}{4}$

Hence, the ratio is 1 : 4.

Q14. A right triangle with sides 3cm, 4cm and 5cm is rotated about the side of 3cm to form a cone. The volume of the cone so formed is: **1 Mark**

A $12\pi cm^3$ **B** $15\pi cm^3$ **C** $16\pi cm^3$ **D** $20\pi cm^3$

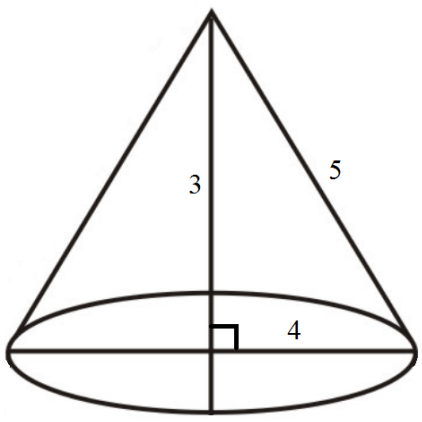
Ans: C $16\pi cm^3$

Solution:

A cone is formed be rotating the right angled triangle above the side 3cm

Height of cone (h) = 3cm

and radius (r) = 4cm



$\therefore = \frac{1}{3}\pi r^2 h = \frac{1}{3}\pi \times (4)^2 \times 3cm^3$

$= \frac{1}{3}\pi \times 16 \times 3 = 16\pi cm^3$

Q15. The radii of two cylinders are in the ratio 3 : 5. If their heights are in the ratio 2 : 3, then the ratio of their curved surface areas is: **1 Mark**

A 2 : 5 **B** 5 : 2 **C** 2 : 3 **D** 3 : 5

Ans: A 2 : 5

Solution:

Given that

$r_1 : r_2 = 3 : 5$ and $h_1 : h_2 = 2 : 3$

Then,

The ratio of C.S.A. of cylinders

$\frac{S_1}{S_2} = \frac{2\pi r_1 h_1}{2\pi r_2 h_2}$

$\frac{S_1}{S_2} = \left(\frac{r_1}{r_2}\right) \times \left(\frac{h_1}{h_2}\right)$

$= \frac{3}{5} \times \frac{2}{3}$

$\frac{s_1}{s_2} = \frac{2}{3}$

$S_1 : S_2 = 2 : 5$

Q16. The maximum volume of a cone that can be carved out of a solid hemisphere of radius r is: **1 Mark**

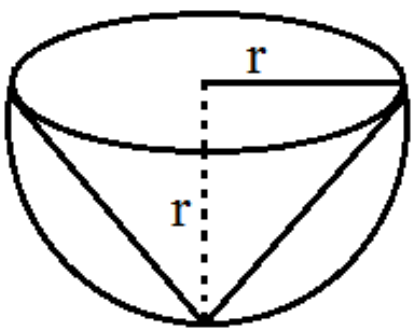
A $3\pi r^2$ **B** $\frac{\pi r^3}{3}$ **C** $\frac{\pi r^2}{3}$ **D** $3\pi r^3$

Ans: B $\frac{\pi r^3}{3}$

Solution:

Radius of cone = r

and height = r



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

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

Q17. The area of the base of a right circular cone is 154cm^2 and its height is 14cm. Its curved surface area is: **1 Mark**

A $154\sqrt{5}\text{cm}^2$ **B** $154\sqrt{7}\text{cm}^2$ **C** $77\sqrt{7}\text{cm}^2$ **D** $77\sqrt{5}\text{cm}^2$

Ans: A $154\sqrt{5}\text{cm}^2$

Solution:

Area of the base of the cone = 154

$\Rightarrow \pi r^2 = 154$

$\Rightarrow \frac{22}{7} \times r^2 = 154$

$\Rightarrow r^2 = 49$

$\Rightarrow r = 7\text{cm}$

$l = \sqrt{r^2 + h^2}$

$\Rightarrow l = \sqrt{7^2 + 14^2}$

$\Rightarrow l = \sqrt{49 + 196}$

$\Rightarrow l = \sqrt{245}$

$\Rightarrow l = 7\sqrt{5}\text{cm}$

Curve surface area of the cone $= \pi rl$

$= \frac{22}{7} \times 7 \times 7\sqrt{5}$

$= 154\sqrt{5}\text{cm}^2$

Q18. Choose the correct answer from the given four options: **1 Mark**

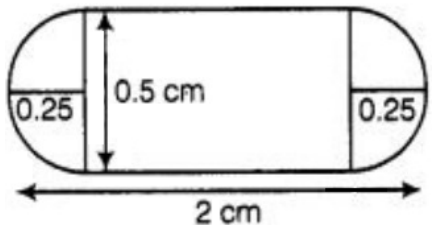
A medicine-capsule is in the shape of a cylinder of diameter 0.5cm with two hemispheres stuck to each of its ends. The length of entire capsule is 2cm. The capacity of the capsule is:

A 0.36cm^3 **B** 0.35cm^3 **C** 0.34cm^3 **D** 0.33cm^3

Ans: A 0.36cm^3

Solution:

Given, diameter of cylinder = Diameter of hemisphere = 0.5cm



[since, both hemispheres are attach with cylinder]

$\therefore$ Radius of cylinder (r) = radius of hemisphere $(r) = \frac{0.5}{2} = 0.25\text{cm}$

$[\because \text{diameter} = 2 \times \text{radius}]$

and total length of capsule = 2cm

$\therefore$ Length of cylindrical part of capsule,

h = Length of capsule - Radius of both hemispheres

= 2 - (0.25 + 0.25) = 1.5cm

Now, capacity of capsule = Volume of cylindrical part + 2 × Volume of hemisphere

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

$\left[\because \text{volume of cylinder} = \pi \times (\text{radius})^2 \times \text{height and volume of hemispere} = \frac{2}{3}\pi(\text{radiud})^3\right]$

$= \frac{22}{7}\left[(0.25)^2 \times 1.5 + \frac{4}{3} \times (0.25)^3\right]$

$= \frac{22}{7}[0.09375 + 0.0208]$

$= \frac{22}{7} \times 0.11455 = 0.36\text{cm}^3$

Hence, the capacity of capsule is 0.36cm^3.

Q19. A solid right circular cone is cut into two parts at the middle of its height by a plane parallel to its base. The ratio of the volume of the smaller cone to the whole cone is: **1 Mark**

A 1 : 2 **B** 1 : 4 **C** 1 : 6 **D** 1 : 8

Ans: D 1 : 8

Solution:

Let the height of the smallr and cone be h and H respecti vely.

Let the radii of the smaller and larger cone be r and R respectively.

Given that the plane cuts the larger cone at the middle of its height.

So, H = 2h ...(i)

Consider, $\triangle \mathrm{AQD}$ and $\triangle \mathrm{APC}$,

$\angle \mathrm{QAD} - \angle \mathrm{PAC}$ .... (Common angle)

$\angle \mathrm{AQD} = \angle \mathrm{APC}$ .... (90° angle)

$\therefore \triangle \mathrm{AQD} \sim \triangle \mathrm{APC}$ ....(AA criterion for similarity)

$\Rightarrow \frac{\mathrm{AQ}}{\mathrm{AP}} = \frac{\mathrm{QD}}{\mathrm{PC}}$

$\Rightarrow \frac{\mathrm{h}}{\mathrm{H}} = \frac{\mathrm{r}}{\mathrm{R}}$

$\Rightarrow \frac{\mathrm{h}}{2\mathrm{h}} = \frac{\mathrm{r}}{\mathrm{R}}$

$\Rightarrow \frac{\mathrm{r}}{\mathrm{R}} = \frac{1}{2}$

That is, R - 2r ...(ii)

$\frac{\text{Volume of the smaller cone}}{\text{Volume of the larger cone}}$

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

$= \frac{\mathrm{r}^2 \mathrm{h}}{(2\mathrm{r})^2 (2\mathrm{h})}$

$= \frac{\mathrm{r}^2 \mathrm{h}}{8\mathrm{r}^2 \mathrm{h}}$

$= \frac{1}{8}$

Hence, the ratio of the volume of the smaller cone to the larger cone is 1 : 8

Q20. On increasing the radii of the base and the height of a cone by 20%, its volume will increase by: **1 Mark**

A 20% **B** 40% **C** 60% **D** 72.8%

Ans: D 72.8%

Solution:

Let the radius and height of the cone be r and h respectively.

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

On increasing each by 20%, the new radius and height

become $\mathrm{r} + \frac{1}{5}\mathrm{r} = \frac{6}{5}\mathrm{r}$ and $\mathrm{h} + \frac{1}{5}\mathrm{h} = \frac{6}{5}\mathrm{h}$.

New volume $= \frac{1}{3}\pi \left(\frac{6}{5}\mathrm{r}\right)^2 \left(\frac{6}{5}\right)\mathrm{h}$

$= \frac{1}{3}\pi \left(\frac{36}{25}\mathrm{r}^2\right)\left(\frac{6}{5}\mathrm{h}\right)$

$= \frac{216}{125}\left(\frac{1}{3}\pi \mathrm{r}^2 \mathrm{h}\right)$

$= \frac{216}{125}$ (Original volume)

So, change in the volume

$= \frac{216}{125}$ (Original volume) - (Original volume)

$= \frac{91}{125}$ (Original volume)

Increase percentage $= \frac{\frac{91}{125}(\text{Original volume})}{\text{Original volume}} \times 100$

$= 72.8\%$

Q21. The cost of painting a cubical box of side 3m at the rate of Rs. 2 per sq. m is: **1 Mark**

A Rs. 120 **B** Rs. 125 **C** Rs. 112 **D** Rs. 108

Ans: D Rs. 108

4. Rs. 108

Solution:

Given: Side of the cube (a) = 3 m

∴ Surface Area of Cube = $6a^2 = 6 \times 3 \times 3 = 54$ sq. cm

Now, Cost of painting the cubical box of 1 sq. m = Rs. 2

∴ Cost of painting the cubical box of 54 sq. m = 54×2 = Rs. 108

Q22. The diameter of a cylinder is 28cm and its height is 20cm. The total surface area of the cylinder is: **1 Mark**

A 2993cm^2 **B** 2992cm^2 **C** 2292cm^2 **D** 2229cm^2

Ans: B 2992cm^2

Solution:

Diameter = 28cm ? radius = 14cm

The total surface area of the cylinder

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

$= 2 \times \frac{22}{7} \times 14(20 + 14)$

$= 2992\text{cm}^2$

Q23. How many bags of grain can be stored in a cuboidal granary (8m × 6m × 3m), if each bag occupies a space of 0.64m^3? **1 Mark**

A 8256 **B** 90 **C** 212 **D** 225

Ans: D 225

Solution:

Volume of the cuboidal granary = (8m × 6m × 3m)

Volume of each bag = 0.64m^3

number of bags that can be srored in the cuboidal granary

$= \frac{\text{Volume of the cuboidal granary}}{\text{Volume of each bag}}$

$= \frac{8 \times 6 \times 3}{0.64}$

$= 225$

Q24. The volumes of two cubes are in the ratio 1 : 27. The ratio of their surface area is: **1 Mark**

A 1 : 3 **B** 1 : 8 **C** 1 : 9 **D** 1 : 18

Ans: C 1 : 9

Solution:

The ratio of the volumes of the two cube is 1 : 27.

Let the sides of the two cubes be a and b.

So, $\frac{a^3}{b^3} = \frac{1}{27}$

$\Rightarrow \frac{a}{b} = \frac{1}{3}$

$\Rightarrow \left(\frac{a}{b}\right)^2 = \left(\frac{1}{3}\right)^2$

$\Rightarrow \frac{a^2}{b^2} = \frac{1}{9}$

$\Rightarrow \frac{6a^2}{6b^2} = \frac{1}{9}$

So, the ratio of the surface areas the two cubes is 1 : 9

Q25. A medicine capsule is in the shape of a cylinder of diameter 0.5cm with a hemisphere tucked at each end. The length of the entire capsule is 2cm. The capacity of the capsule is: **1 Mark**

A 0.33 cm^2 **B** 0.34 cm^2 **C** 0.35 cm^2 **D** 0.36 cm^2

Ans: D 0.36 cm^2

Solution:

Radiud of the capsule = 0.25cm

Let the length of the cylindrical part of the capsule be x cm.

So, 0.25 + x + 0.25 = 2

? 0.5 + x = 2

? x = 1.5

Capacity of the capsule

= 2 × (Volume of the hemisphere) + (Volume of the cylinder)

$= 2 \times \left(\frac{2}{3}\pi r^3\right) + (\pi r^2 h)$

$= 2 \times \left(\frac{2}{3} \times \frac{22}{7} \times 0.25^3\right) + \left(\frac{22}{7} \times 0.25^2 \times 1.5\right)$

$= 0.36\text{cm}^2$

Q26. The area of the base of a rectangular tank is 6500cm^2 and the volume of water contained in it is 2.6m^3. The depth of water in the tank is: **1 Mark**

A 3.5m **B** 4m **C** 5m **D** 8m

Ans: B 4m

Solution:

Area of the base of the rectangular tank

$= 6500\text{cm}^2$

$= \frac{(6500)}{100^2}\text{m}^2$

Let the depth of the water be h metres.

So, $\frac{(6500)}{(100^2)} \times h = 2.6$

$\Rightarrow h = 4m$

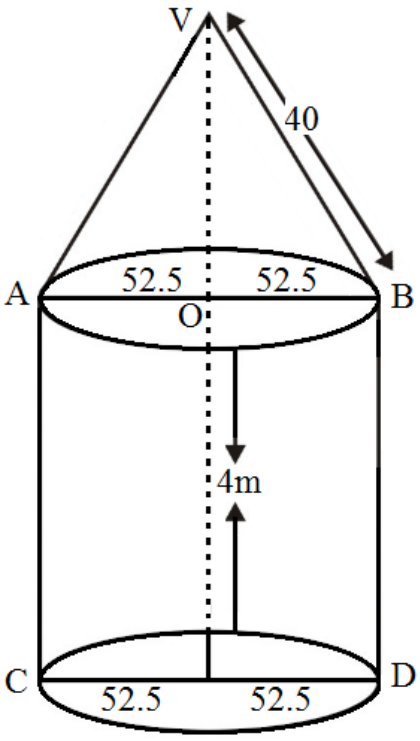
Hence, the depth of the water is 4m.

Q27. A circus tent is cylindrical to a height of 4m and conical above it. If its diameter is 105m and its slant height is 40m, the total area of the canvas required in m^2 is: **1 Mark**

A 1760 **B** 2640 **C** 3960 **D** 7920

Ans: D 7920

Solution:



For conical portion

r = 52.5 and l = 40m

Curved surface area of the conical portion

$= \pi rl$

$= \pi \times 52.5 \times 40$

$= 2100\pi \ m^2$

For cylindrical portion we have

r = 52.5m and h = 4m

Then,

Curved surface area of cylindrical portion

$= 2\pi rh$

$= 2 \times \pi \times 52.5 \times 4$

$= 420\pi \ m^2$

Area of canvas used for making the tent.

Q28. If the radius of a sphere becomes 3 times, then its volume will become: **1 Mark**

A 3 times **B** 6 times **C** 9 times **D** 27 times

Ans: D 27 times

Solution:

Let the radius of the sphere be r.

So, the volume of the shere $= \frac{4}{3}\pi r^3$

If the radius becomes 3r,

The volume $= \frac{4}{3}\pi(3r)^3 = 27 \times \frac{4}{3}\pi r^3 = 27$ times the original sphere.

Q29. The volumes of two spheres are in the ratio 64 : 27. The ratio of their surface areas is: **1 Mark**

A 9 : 16 **B** 16 : 9 **C** 3 : 4 **D** 4 : 3

Ans: B 16 : 9

Solution:

Let the radii of the speres be r and R.

The volume of the spheres are in ratio 64 : 27.

$\Rightarrow \frac{\frac{4}{3}\pi r^3}{\frac{4}{3}\pi R^3} = \frac{64}{27}$

$\Rightarrow \frac{r^3}{R^3} = \frac{64}{27}$

$\Rightarrow \frac{r^3}{R^3} = \frac{64}{27}$

$\Rightarrow \frac{r}{R} = \frac{4}{3}$

Ratio of the sirface area of the spheres

$= \frac{4\pi r^2}{4\pi R^2}$

$= \left(\frac{r}{R}\right)$

$= \left(\frac{4}{3}\right)^2$

$= \frac{16}{9}$

Hence, the ratio is 16 : 9

Q30. The curved surface area of a cylinder is 264m^2 and its volume is 924m^3. The ratio of its diameter to its height is: **1 Mark**

A 3 : 7 **B** 7 : 3 **C** 6 : 7 **D** 7 : 6

Ans: B 7 : 3

S = 264m^2

The volume of cylinder

V = 924m^3

$2\pi rh = 264$

$2rh = \frac{264\times7}{22}$

$2rh = 84$

$rh = 42$

$\pi r^2 h = 924$

$r(rh) = \frac{924\times7}{22}$

From eq. (i) and (ii),

We get r = 7

Putting the value in (i)

h = 6

$\frac{d}{h} = \frac{14}{6} = \frac{7}{3}$

$d : h = 7 : 3$

Q31. The diameter of the base of a cylinder is 4cm and its height is 14cm. The volume of the cylinder is: **1 Mark**

A 176cm^3 **B** 196cm^3 **C** 276cm^3 **D** 352cm^3

Ans: A 176cm^3

Solution:

Volume of the cylinder $= \pi r^2 h$

$= \frac{22}{7} \times 2 \times 2 \times 14$ ....(Since the diameter = 4cm)

$= 176\text{cm}^3$

Q32. The curved surface are of a cylinder is 1760cm^2 and its base radius is 14cm. The height of the cylinder is: **1 Mark**

A 10cm **B** 15cm **C** 20cm **D** 40cm

Ans: C 20cm

Solution:

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

$= 2 \times \frac{22}{7} \times 14 \times h$

$\Rightarrow 2 \times \frac{22}{7} \times 14 \times h = 1760$

$\Rightarrow h = \frac{1760}{88} = 20\text{cm}$

Hence, the height of the cylinder is 20cm.

Q33. A rectangular sheet of paper 40cm × 22cm, is rolled to form a hollow cylinder of height 40cm. The radius of the cylinder (in cm) is: **1 Mark**

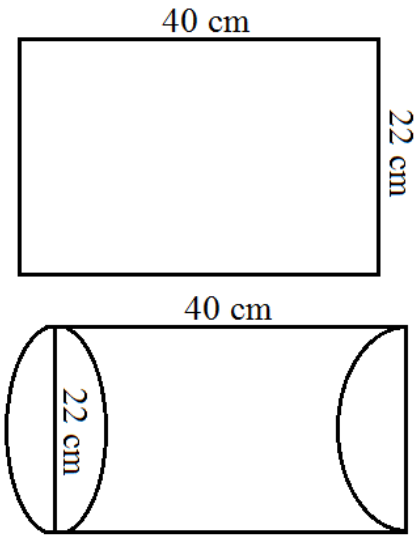
A 3.5 **B** 7 **C** $\frac{80}{7}$ **D** 5

Ans: A 3.5

Solution:

Length of rectangular sheet(l) = 40cm

and width (b) = 22cm



By rolling it is cylinder is formed

$\therefore$ circumference of cylinder = b = 22cm

Let r be the radius

$\therefore 22 = 2 \times \frac{22}{7}\mathrm{r} \Rightarrow \mathrm{r} = \frac{22\times7}{2\times22} = \frac{7}{2}$

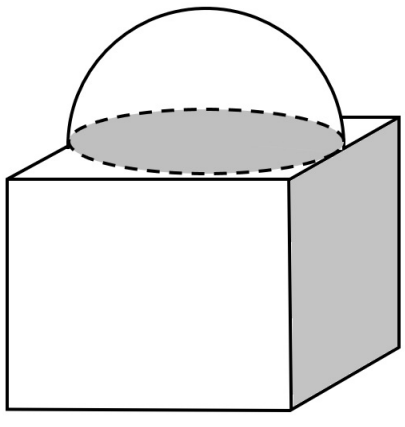
$\therefore \text{Radius} = \frac{7}{2} = 3.5\text{cm}$

Q34. A cubical block of side 7cm is surmounted by a hemisphere. The greatest diameter of the hemisphere is: **1 Mark**

A 14cm **B** 10.5cm **C** 3.5cm **D** 7cm

Ans: D 7cm

Solution:



It is clear that Maximum diameter of hemisphere can be the side of the cube.

$\therefore$ The greatest diameter of the hemisphere = 7cm

Q35. Directions: In the following questions, a statement of assertion (A) is followed by a statement of reason (R).Mark the correct choice as: **1 Mark**

Assertion: The radii of two cones are in the ratio 2 : 3 and their volumes in the ratio 1 : 3.Then the ratio of their heights is 3 : 2.

Reason: Volume of the cone $= \frac{1}{3}\pi\mathrm{r}^2.\mathrm{h}$

A Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

B Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

C Assertion (A) is true but reason (R) is false. **D** Assertion (A) is false but reason (R) is true.

Ans: D Assertion (A) is false but reason (R) is true.

Solution:

We have, ratio of volume $= \frac{\frac{1}{3}\pi\times(2\mathrm{x})^2\times\mathrm{h}_1}{\frac{1}{3}\pi\times(3\mathrm{x})^2\times\mathrm{h}_2}$

$\frac{1}{3} = \frac{4}{9} \times \frac{\mathrm{h}_1}{\mathrm{h}_2}$

$\frac{\mathrm{h}_1}{\mathrm{h}_2} = \frac{3}{4}$

$\mathrm{h}_1 : \mathrm{h}_2 = 3 : 4$

Q36. Directions: In the following questions, a statement of assertion (A) is followed by a statement of reason (R).Mark the correct choice as: **1 Mark**

Assertion: If the radius of a cone is halved and volume is not changed, then height remains same.

Reason: If the radius of a cone is halved and volume is not changed then height must become four times of the original height.

A Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

B Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

C Assertion (A) is true but reason (R) is false. **D** Assertion (A) is false but reason (R) is true.

Ans: **D** Assertion (A) is false but reason (R) is true.

Solution:

$\frac{V_1}{V_2} = \frac{\left(\frac{1}{3}\right)\pi r^2 h_1}{\left(\frac{1}{3}\right)\pi\left(\frac{r}{2}\right)^2 h_2} = \frac{4h_1}{h_2}$

As, $V_1 = V_2$

$h_2 = 4h_1$

Q37. **Directions:** In the following questions, a statement of assertion (A) is followed by a statement of reason (R).Mark the correct choice as: **1 Mark**

Assertion: If the areas of three adjacent faces of a cuboid are x, y, z respectively then the volume of the cuboid is $\sqrt{xyz}$

Reason: Volume of a cuboid whose edges are l, b and h is lbh units.

A Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

B Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

C Assertion (A) is true but reason (R) is false.

D Assertion (A) is false but reason (R) is true.

Ans: **A** Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

Solution:

$lb = xbh = ylh = z$

$\Rightarrow lb \times bh \times lh = xyz$

$\Rightarrow l^2b^2h^2 = xyz$

$\Rightarrow lbh = \sqrt{xyz}$

$\Rightarrow Volume = \sqrt{xyz}$

Q38. **Directions:** In the following questions, a statement of assertion (A) is followed by a statement of reason (R).Mark the correct choice as: **1 Mark**

Assertion: Total surface area of the cylinder having radius of the base 14cm and height 30cm is 3872cm^2

Reason: If r be the radius and h be the height of the cylinder, then total surface area $(2\pi rh + 2\pi r^2)$

A Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

B Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

C Assertion (A) is true but reason (R) is false.

D Assertion (A) is false but reason (R) is true.

Ans: **A** Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

Solution:

Total surface area $= 2\pi rh + 2\pi r^2$

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

$= 2 \times \frac{22}{7} \times 14(30 + 14) = 88(44)$

$= 3832 cm^2$

Q39. **Directions:** In the following questions, a statement of assertion (A) is followed by a statement of reason (R).Mark the correct choice as: **1 Mark**

Assertion: The number of coins 1.75cm in diameter and 2mm thick is formed from a melted cuboid 10cm × 5.5cm × 3.5cm is 400.

Reason: Volume of a cylinder $= \pi r^2$ cubic units and area of cuboid $= (1 \times b \times h)$ cubic units.

A Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

B Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

C Assertion (A) is true but reason (R) is false.

D Assertion (A) is false but reason (R) is true.

Ans: **A** Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

Solution:

$\text{Number of coins} = \frac{\text{volume of cuboid}}{\text{volume of one coin}}$

$= \frac{10 \times 5.5 \times 3.5}{\pi \times \frac{1.75}{2} \times \frac{1.75}{2} \times 0.2}$

$= \frac{10 \times 5.5 \times 3.5}{\frac{22}{7} \times \frac{1.75}{2} \times \frac{1.75}{2} \times 0.2} = 400$

Q40. **Directions:** In the following questions, a statement of assertion (A) is followed by a statement of reason (R).Mark the correct choice as: **1 Mark**

Assertion: The volume of a hall, which is 5 times as high as it is broad and 8 times as long as it is high, is 12.8m^3.The breadth of the hall is 25cm.

Reason: The total surface area of a cuboid of length (l), breadth (b) and height (h) is 2[lb + bh + lh]

A Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

B Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

C Assertion (A) is true but reason (R) is false.

D Assertion (A) is false but reason (R) is true.

Ans: **D** Assertion (A) is false but reason (R) is true.

Solution:

Let breadth of a hall be x and height $= 5\mathrm{x}$

Length $8 \times 5\mathrm{x} = 40\mathrm{x}$

$\therefore$ Volume of hall $\mathrm{x} \times 5\mathrm{x} = \times 40\mathrm{x} = 200\mathrm{x}^3$

But, volume of hall $= 12.8\mathrm{m}^3$

$\therefore 200\mathrm{x}^3 = 12.8\mathrm{m}^3$

$\Rightarrow \mathrm{x}^3 = \frac{12.8}{200} = \frac{8}{125}$

$\Rightarrow \mathrm{x} = 0.4\mathrm{m} = 40\mathrm{cm}$