EXERCISE 12.1

Choose the correct answer from the given four options:

1. A cylindrical pencil sharpened at one edge is the combination of

(A) a cone and a cylinder **(B) frustum of a cone and a cylinder**

(C) a hemisphere and a cylinder **(D) two cylinders.**

Solution:

(A) a cone and a cylinder

The Nib of a sharpened pencil = conical shape

The rest of the part of a sharpened pencil = cylindrical

Therefore, a pencil is a combination of cylinder and a cone.

2. A *surahi* is the combination of

(A) a sphere and a cylinder **(B) a hemisphere and a cylinder**

(C) two hemispheres **(D) a cylinder and a cone.**

Solution:

(A) a sphere and a cylinder

The top part of surahi = cylindrical shape

Bottom part of surahi = spherical shape

Therefore, surahi is a combination of Sphere and a cylinder.

3. A plumbline (*sahul*) is the combination of (see Fig. 12.2)

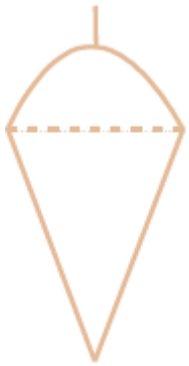
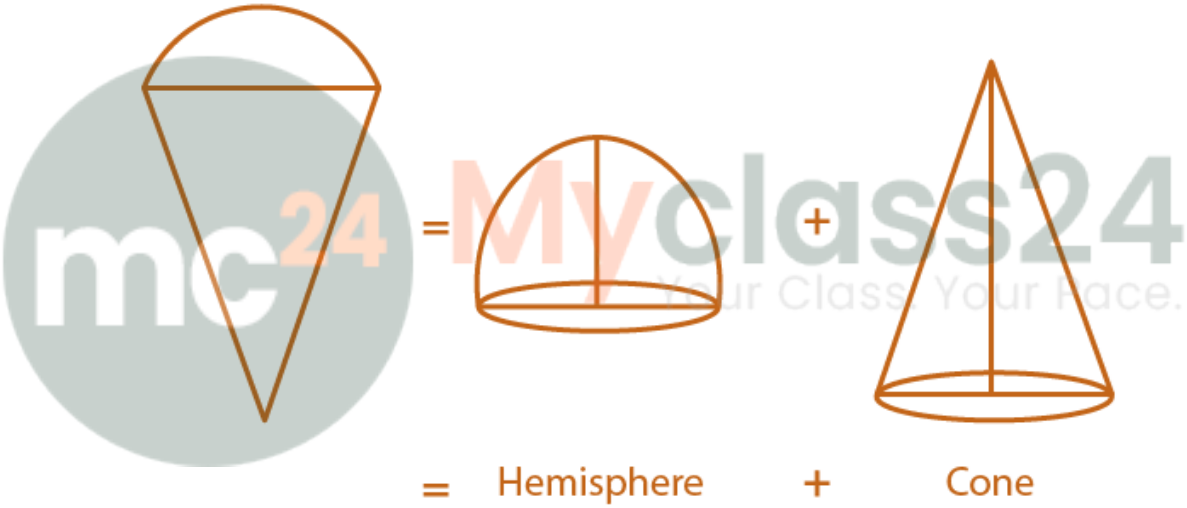


Fig. 12.2

(A) a cone and a cylinder **(B) a hemisphere and a cone**
(C) frustum of a cone and a cylinder **(D) sphere and cylinder**

Solution:

(B) a hemisphere and a cone



The upper part of plumbline = hemispherical,
The bottom part of plumbline = conical
Therefore, it is a combination of hemisphere and cone.

4. The shape of a glass (tumbler) (see Fig. 12.3) is usually in the form of

Fig. 12.3

(A) a cone **(B) frustum of a cone**
(C) a cylinder **(D) a sphere**

Solution:

(B) frustum of a cone

The shape of glass is a frustum or specifically, an inverted frustum.

5. The shape of a *gilli*, in the *gilli-danda* game (see Fig. 12.4), is a combination of

Fig. 12.4

(A) two cylinders **(B) a cone and a cylinder**
(C) two cones and a cylinder **(D) two cylinders and a cone**

Solution:

(C) two cones and a cylinder

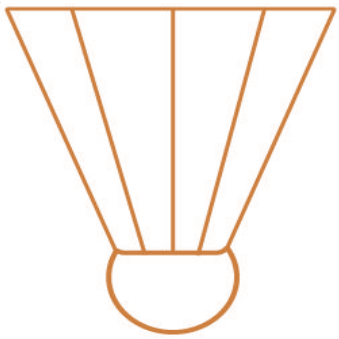
The left and right part of a gilli = conical
The central part of a gilli = cylindrical
Therefore, it is a combination of a cylinder and two cones.

6. A shuttle cock used for playing badminton has the shape of the combination of

(A) a cylinder and a sphere **(B) a cylinder and a hemisphere**
(C) a sphere and a cone **(D) frustum of a cone and a hemisphere**

Solution:

(D) frustum of a cone and a hemisphere



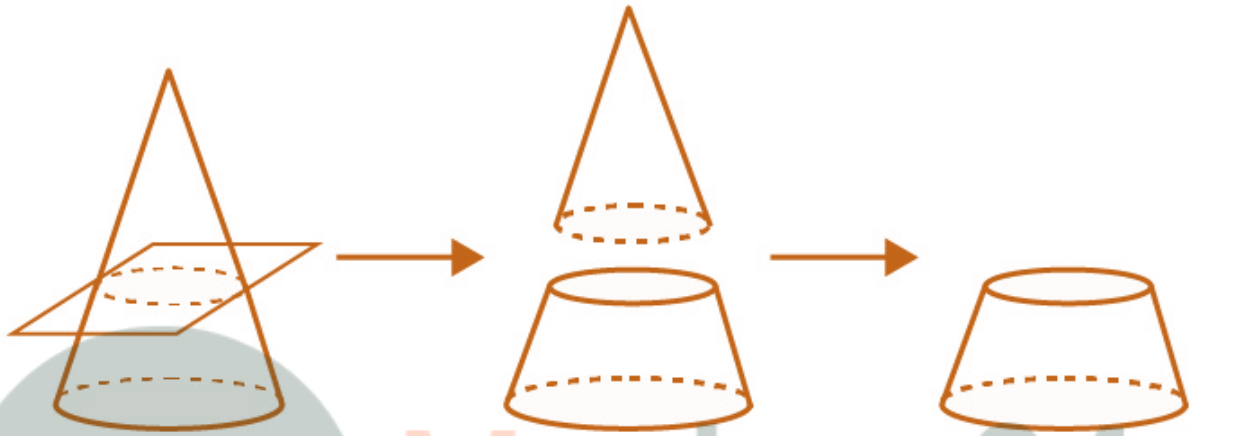
The cork of a shuttle = hemispherical shapes
The upper part of a shuttle = shape of frustum of a cone.
Therefore, it is a combination of frustum of a cone and a hemisphere.

7. A cone is cut through a plane parallel to its base and then the cone that is formed on one side of that plane is removed. The new part that is left over on the other side of the plane is called

(A) a frustum of a cone **(B) cone**
(C) cylinder **(D) sphere**

Solution:

(A) a frustum of a cone



When a cone is divided into two parts by a plane through any point on its axis parallel to its base, the upper and lower parts obtained are cone and a frustum respectively.

8. A hollow cube of internal edge 22cm is filled with spherical marbles of diameter 0.5 cm and it is assumed that 1/8 space of the cube remains unfilled. Then the number of marbles that the cube can accommodate is

(A) 142296 **(B) 142396**
(C) 142496 **(D) 142596**

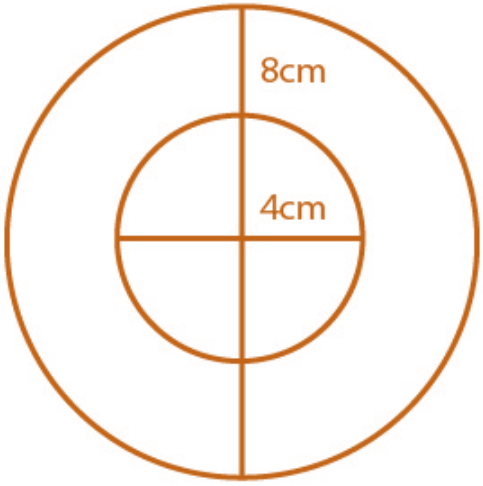
Solution:

(A) 142296
According to the question,
Volume of cube $=22^3=10648cm^3$
Volume of cube that remains unfilled $=1/8\times10648=1331cm^3$
volume occupied by spherical marbles $=10648-1331=9317cm^3$
Radius of the spherical marble = 0.5/2=0.25cm=1/4cm
Volume of 1 spherical marble = $4/3\times22/7\times(1/4)^3=11/168cm^3$
Numbers of spherical marbles, n = $9317\times(11/168)=142296$

9. A metallic spherical shell of internal and external diameters 4 cm and 8 cm, respectively is melted and recast into the form a cone of base diameter 8cm. The height of the cone is

(A) 12cm (B) 14cm (C) 15cm (D) 18cm

Solution:



Spherical shell

Volume of spherical shell = Volume of cone recast by melting
For Spherical Shell,
Internal diameter, $d_1 = 4$ cm
Internal radius, $r_1 = 2$ cm
[as radius = 1/2 diameter]
External diameter, $d_2 = 8$ cm
External radius, $r_2 = 4$ cm
Now,
As volume of spherical shell= $4/3\ \pi (r_2^3 - r^3)$
where r_1 and r_2 are internal and external radii respectively.
volume of given shell = $4/3\ \pi (4^3 - 2^3)$
$= 4/3\ \pi (56)$
$= (224/3)\ \pi$
We know that,
Volume of cone = $224\pi /3$ cm^3
For cone,
Base diameter = 8 cm
Base radius, r = 4 cm
Let Height of cone = 'h'.
We know,
Volume of cone = $(1/3)\ \pi r^2 h$,
Where r = Base radius and h = height of cone
Volume of given cone = $(1/3)\ \pi 4^2 h$
$\Rightarrow 224\pi /3 = 16\pi h /3$
$\Rightarrow 16h = 224$
$h = 14$ cm
So, Height of cone is 14 cm.

10. A solid piece of iron in the form of a cuboid of dimensions 49cm × 33cm × 24cm, is moulded to form a solid sphere. The radius of the sphere is

(A) 21cm (B) 23cm (C) 25cm (D) 19cm

Solution:

As we know,
Volume of cuboid = lbh
Where, l = length, b = breadth and h = height
For given cuboid,
Length, l = 49 cm
Breadth, b = 33 cm
Height, h = 24 cm
Volume of cube = 49× (33) × (24) cm^3
Now,
Let the radius of cube be r.
As volume of sphere = 4/3 πr^3
Where r = radius of sphere
Also,
Volume of cuboid = volume of sphere molded
So,
49(33)(24) = 4/3 πr^3
$\Rightarrow \pi r^3 = 29106$
$\Rightarrow r^3 = 29106 \times 22/7$
$\Rightarrow r^3 = 9261$
$\Rightarrow r = \sqrt[3]{9261}$ cm = 21 cm
Hence, radius of sphere is 21 cm