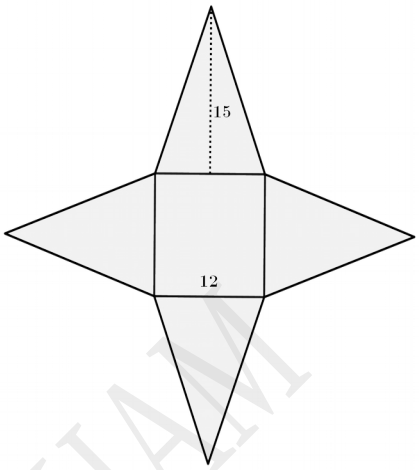
WANDOOR GANITHAM SSLC MATHEMATICS STUDY MATERIAL : 2023

SOLIDS

QUESTION – 1



The figure shows the unfolded form of a solid .

a) What is the most suitable name of the solid ?

b) Which are the measures of the solid given in the figure?

c) Calculate the surface area of the solid .

QUESTION – 2

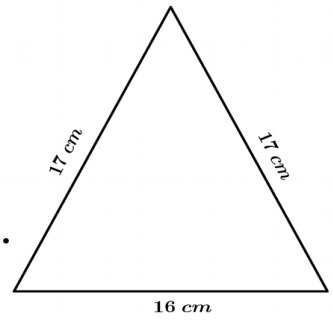
Base area of a square pyramid is 100 square centimetres and its slant height is 13 centi - metres .

a) Compute the base edge and height of the pyramid .

b) Compute the volume of the pyramid .

QUESTION – 3

Lateral face of a square pyramid is shown in the picture .



a) What is the length of the base edge of the pyramid ?

b) Calculate the slant height and the surface area of the pyramid .

QUESTION – 4

The volume of a solid square prism made up of wax is 1200 cubic centimetres . A square pyramid of maximum volume is carved out from this . The height of the prism is 12 centime tres .

a) What is the height of the square pyramid ?

b) What is the volume of the square pyramid ?

c) The remaining portion of the prism is melted and recast into small square pyramids of base edge 5 centimetres and height 6 centimetres . How many small pyramids can be made ?

QUESTION – 5

Base diagonal of a solid square pyramid made up of iron is 16 centimetres and its lateral edge is 17 centimetres .

a) What are the base edge and height of the pyramid ?

b) Calculate the volume of the pyramid .

c) The weight of 1 cubic centimetre of iron is 7.8 grams .Calculate the weight of the pyramid

QUESTION – 6

A toy is in the shape of a square pyramid of base perimeter 40 centimetres and height 12 centimetres .

a) What is the base edge and slant height of the toy ?

b) Calculate the surface area of the toy .

c) What is the total cost of painting 10000 such toys , at 50 rupees per square metre ?

QUESTION – 7

The base edges of two square pyramids are in the ratio 3 : 4 and their heights are in the ratio 5 : 6 .

a) If the base edge of the first pyramid is taken as 3 a centimetres , what will be the base edge of the second pyramid ?

b) If the height of the second pyramid is taken as 6 h centimetres , what will be the height of the first pyramid ?

c) Find the ratio of the volumes of the pyramids .

d) If the volume of the first pyramid is 300 cubic centimetres , what will be the volume of the second pyramid ?

QUESTION – 8

The lateral faces of a square pyramid are equilateral triangles and the length of a lateral edge is 20 centimetres .

a) What is the length of its base edge ?

b) Calculate the surface area of the pyramid .

QUESTION – 9

The base area of a square pyramid is 256 square centimetres and the total length of all its edges is 132 centimetres .

a) What is the length of its base edge ?

b) What is the slant height of the pyramid ?

c) Calculate the surface area of the pyramid .

QUESTION – 10

The base diagonal of a square pyramid is $20\sqrt{2}$ centimetres and its surface area is 1440 square centimetres .

a) What is the length of its base edge ?

b) What is the height of the pyramid ?

c) Calculate the volume of the pyramid .

QUESTION – 11

The slant height of a square pyramid is 17 centimetres and its surface area is 800 square centimetres .

a) What number is to be added to $x^2 + 34x$ to get a perfect square ?

b) What is the length of the base edge of the pyramid ?

c) Calculate the volume of the pyramid .

QUESTION – 12

The height of a square pyramid is 8 centimetres and its volume is 384 cubic centimetres .

a) What is the length of the base edge of the pyramid ?

b) What is the slant height of the pyramid ?

c) Calculate the surface area of the pyramid .

QUESTION – 13

a) What is the slant length of a square pyramid of base edge 24 centimetres and lateral edge 20 centimetres ?

b) Is it possible to make a square pyramid with base edge 24 centimetres and lateral edge 13 centimetres ?

c) Can we make a square pyramid with the base area equal to the lateral surface area ? Why ?

QUESTION – 14

From a circle of radius 18 centimetres , a sector of central angle 60^0 is cut out and made into a cone .

a) What is the slant height of the cone ?

b) What is the relation between the arc length of the sector and the base perimeter of the cone ?

c) What is the base radius of the cone ?

d) If another cone is made from the remaining portion of the circle , what will be its slant height and base radius ?

QUESTION – 15

A sector is made into a cone of base radius 5 centimetres and slant height 15 centimetres .

a) What is the radius of the sector ?

b) What is te central angle of the sector ?

c) Prove that the sector used to make a cone of base radius 5 centimetres and slant height 10 centimetres is a semicircle .

QUESTION – 16

A sector of arc length 6π centimetres and area 36π square centimetres is made into a cone .

a) What is the relation between the arc length of the sector and the base perimeter of the cone ?

b) What is the relation between the area of the sector and the curved surface area of the cone ?

c) Compute the radius and slant height of the cone .

QUESTION – 17

A sector is made into a cone of base diameter 10 centimetres and curved surface area 75π square centimetres .

a) What is the slant height of the cone ?

b) Compute the radius and central angle of the sector.

QUESTION – 18

The base perimeter of a cone is 10π centimetres and its height is 12 centimetres .

a) What is the slant height of the cone ?

b) Calculate the curved surface area of the cone .

c) Calculate the surface area of the cone .

QUESTION – 19

A conical fire work is of base area 64π square centimetres and height 15 centimetres .

a) What are the base radius and the slant height of the the fire work ?

b) Calculate the surface area the fire work .

c) 10000 such fireworks are to be wrapped in colour paper . The price of the colour paper is 5 rupees per square metre . What is the total cost ?

[Hint : Take the value of π as 3.14]

QUESTION – 20

The slant height of a cone is 20 centimetres and its surface area is 384π square centimetres .

a) What number is to be added to $x^2 + 20x$ to get a perfect square ?

b) What are the base radius and height of the cone ?

c) Calculate the volume of the cone .

QUESTION – 21

The base perimeter of a cone is 10π centimetres and its surface area is 90π square centimetres .

a) What are the base radius and slant height of the cone ?

b) Calculate the volume of the cone .

QUESTION – 22

The base area of a solid cone made up of copper is 144π square centimetres and its curved surface area is 240π square centimetres .

a) What are the base radius and height of the cone ?

b) Calculate the volume of the cone .

c) If the weight of one cubic centimetres of copper is 9 grams , what is the weight of the cone ?

[Hint : Take the value of π as 3.14]

QUESTION – 23

The volume of a cone is 240π cubic centimetres and its height is 5 centimetres .

a) What are the base radius and slant height of the cone ?

b) Calculate the surface area of the cone .

c) What is the total cost of painting such 400 cones , at 75 rupees per square metre ?

[Hint : Take the value of π as 3.14]

QUESTION – 24

The base perimeters of two cones are in the ratio 3 : 4 and their slant heights are in the ratio 2 : 5 .

a) If the slant height of the first cone is taken as $2l$ centimetres , what will be the slant height of the second cone ?

b) What is the ratio of the base radii of the cones ?

c) Compute the ratio of the curved surface areas of the cones .

d) If the curved surface area of the second cone is 400π square centimetres , what is the curved surface area of the first cone ?

QUESTION – 25

The base radius of a metal cylinder is 12 centimetres and its height is 30 centimetres . A largest cone is carved out from this cylinder .

a) What is the height of the cone ?

b) What is the volume of the cone ?

c) What is the volume of the remaining portion of the cylinder ?

d) By melting and recasting the remaining portion of the cylinder , how many small cones of base radius 6 centimetres and height 10 centimetres can be made ?

QUESTION – 26

The base radius of a cylindrical shaped vessel is 18 centimetres and its height is 40 centimetres . In this water is filled at a height of 30 centimetres . A cone of base radius 9 centimetres and height s12 centimetres is completely immersed in it .

a) What is the volume of the cone ?

b) What is the relation between the volume of the raised water and the volume of the cone ?

c) Compute the increase in the water level .

QUESTION – 27

From a cube of edge 10 centimetres , a largest sphere is carved out .

a) What is the diameter of the sphere ?

b) Calculate the volume and the surface area of the sphere .

QUESTION – 28

The surface area of a sphere is 400π square centimetres .

a) What is the radius of the sphere ?

b) Calculate the volume of the sphere .

QUESTION – 29

The volume of a sphere is 288π cubic centimetres .

a) What is the radius of the sphere ?

b) Calculate the surface area of the sphere .

QUESTION – 30

A cone of height 24 centimetres is carved out from a solid sphere made up of wood of radius 15 centimetres .

a) What is the volume of the sphere ?

b) What is the radius of the cone ?

c) Compute the volume of the cone .

d) What is the volume of the remaining portion of the sphere ?

QUESTION – 31

A cone of base radius 5 centimetres is carved out from a solid sphere made up of wood of radius 13 centimetres .

a) What is the volume of the sphere ?

b) What is the height of the cone ?

c) Compute the volume of the cone .

d) What is the volume of the remaining portion of the sphere ?

QUESTION – 32

The radii of two spheres are in the ratio 3 : 4 .

a) If the radius of the first sphere is taken as 3r , what is the radius of the second sphere ?

b) What is the ratio of their surface areas ?

c) What is the ratio of their volumes ?

QUESTION – 33

The surface areas of two spheres are in the ratio 16 : 25 .

a) What is the ratio of their radii ?

b) What is the ratio of their volumes ?

QUESTION – 34

A solid sphere of radius 9 centimetres is cut into two equal halves .

a) Compute the volume and surface area of the sphere .

b) Compute the volume and surface area of each hemisphere .

QUESTION – 35

The base radius and length of a metal cylinder are 8 centimetres and 20 centimetres .

a) Compute the volume of the cylinder .

b) If the cylinder is melted and recast into spheres of radius 4 centimetres each , how many spheres can be made ?

c) If the cylinder is melted and recast into hemispheres of radius 4 centimetres each instead of spheres , how many hemispheres can be made ?

QUESTION – 36

The base perimeter and height of a metal cone are 24π centimetres and 30 centimetres

a) What is the radius of the cone ?

b) Calculate the volume of the cone .

c) This cone is melted and recast into 40 identical spheres . What is the radius of each sphere ?

QUESTION – 37

A cone of maximum possible size is carved out from a solid hemisphere of radius 9 centimetres .

a) What are the radius and height of the cone ?

b) Calculate the volume of the cone .

c) What is the ratio of the volumes of the hemisphere and the cone ?

QUESTION – 38

A square pyramid of maximum possible size is carved out from a solid hemisphere of radius 12 centimetres .

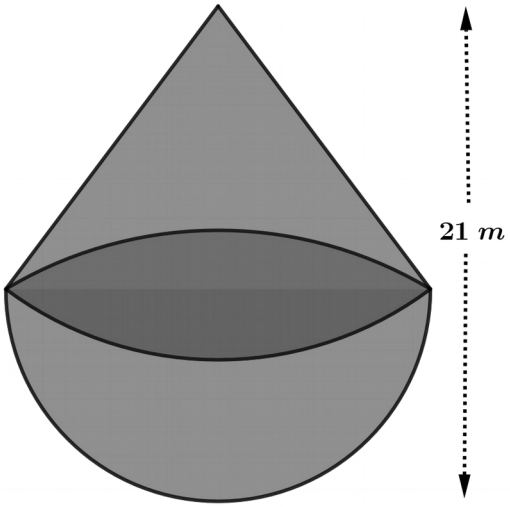
a) What are the height and base edge of the square pyramid ?

b) Calculate the volume of the square pyramid .

c) What is the ratio of the volumes of the hemisphere and the square pyramid ?

QUESTION – 39

A toy is in the shape of a hemisphere is attached to a cone as shown in the picture . Its common radius is 9 centimetres and the total height is 21 centimetres .

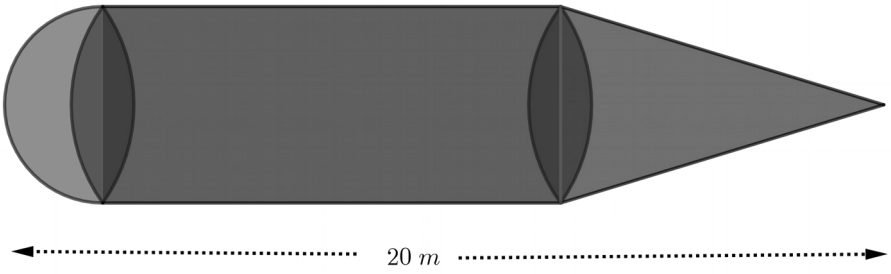


a) What are the height and slant height of the cone ?

b) Calculate the curved surface area of the cone .

c) Calculate the surface area of the toy .

QUESTION – 40



A solid is in the shape of a hemisphere is attached to one end of a cylinder and a cone is attached to the other end .Its common radius is 3 metres and its total length is 20 metres The height of the cylinder is 12 metres .

a) What is the height of the cone ?

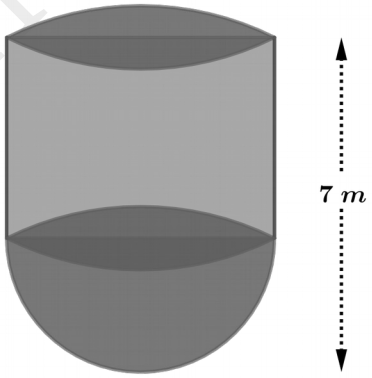
b) Calculate the volume of the cone .

c) Calculate the volume of the hemisphere .

d) Calculate the volume of the solid .

QUESTION – 41

A water tank is in the shape of a hemisphere attached to a cylinder . Its radius is 3 metres and the total height is 7 metres .



a) What is the height of the cylinder ?

b) What is the volume of the cylinder ?

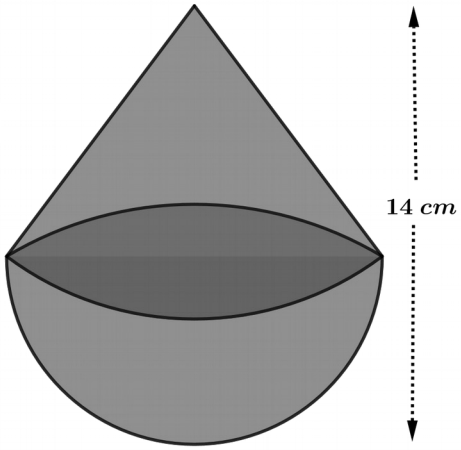
c) What is the volume of the tank .

c) How many litres of water can the tank hold ?

[Hint : Take the value of π as 3.14]

QUESTION – 42

A toy is in the shape of a cone is attached to a hemisphere .Its common diameter is 12 centimetres and its total length is 14 centimetres .



a) What are the height and slant height of the cone ?

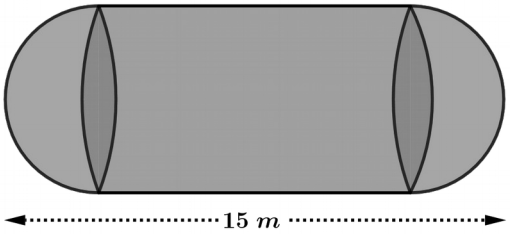
b) Calculate the curved surface area of the cone .

c) Calculate the surface area of the toy .

c) What is the total cost to paint 10000 such toys at the rate of 50 rupees per square metre ?

[Hint : Take the value of π as 3.14]

QUESTION – 43



A water tank is in the shape of a cylinder attached to two hemispheres . Its common radius is 3 metres and its total height is 15 metres .

a) Calculate the volume of a hemisphere .

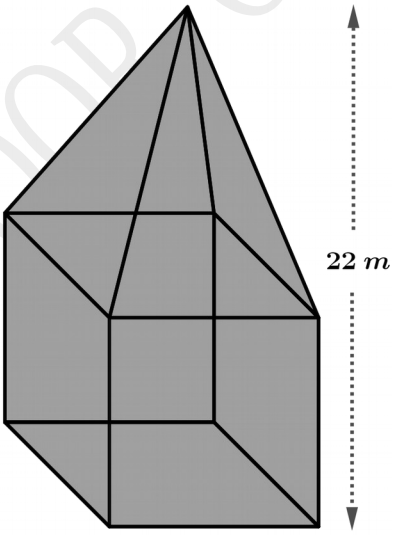
b) What is the length of the cylinder ?

c) Calculate the volume of the cylinder .

c) How much litres of water can hold in the tank ?

[Hint : Take the value of π as 3.14]

QUESTION – 44



A solid is in the shape of a square pyramid attached to a cube and its total height is 22 centimetres . The length of an edge of a cube is 10 centimetres .

a) What are the height and slant height of the square pyramid ?

b) Calculate the volume of the square pyramid ?

c) Calculate the volume and surface area of the of the solid .