MATHS

BOOKS - CBSE COMPLEMENTARY MATERIAL MATHS (HINGLISH)

SURFACE AREAS AND VOLUMES

Part A

1. If the volume of a sphere is numerrically equal to its surface area. Then radius of

sphere is

A. 1 unit

B. 3 unit

C. 2 unit

D. 6 unit

Answer: B

2. The total surface area of a solid hemisphere of radius r is

A. $2\pi r^2$

B. $3\pi r^2$

C. $4\pi r^2$

D. $\dfrac{2}{3}\pi r^3$

Answer: B

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3. In a cylinder, if radius is halved and height is doubled, the volume will be same (b) doubled (d) halved (d) four times

    A. Same

    B. Double

    C. Halved

    D. Four times

Answer: C

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4. The height of a cone of diameter 10 cm and slant height 13 cm, is

    A. 12 cm

    B. 13 cm

    C. $\sqrt{69}cm$

    D. $\sqrt{194}cm$

Answer: A

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5. The radius of a hemispherical balloon increases from 6 cm to 12 cm as air is being pumped into it. The ratios of the surfcae area of the balloom in the two cases is

A. $1:4$

B. $1:3$

C. $2:3$

D. $2:1$

Answer: A

6. How many bricks will be required to construct a wall 13.5 m long, 6m high and 22.5 cm thick if each brick measures $(27cm \times 12.5cm \times 9cm)$?

A. 6000

B. 7500

C. 5000

D. 3750

Answer: A

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7. If the radius of a sphere is 2r , them its volume will be

A. $\left(\dfrac{32}{93}\right)\pi r^3$

B. $4\pi r^3$

C. $\dfrac{4}{3}\pi r^3$

D. $\dfrac{8\pi r^3}{3}$

Answer: A

8. The radius of a sphere is 21cm, what is the surface area of the sphere?

    A. $12932cm^2$

    B. $4312cm^2$

    C. $9702cm^2$

    D. $5544cm^2$

Answer: D

9. The length of the longest rod that can be placed in a room of dimensions $10m \times 10m \times 5m$ is $15\sqrt{3}$ (b) 15 (c) $10\sqrt{2}$ (d) $5\sqrt{3}$

    A. 15m

    B. 16m

    C. 12m

D. 10m

Answer: A

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10. The diameter of a copper shere is 6 cm. The sphere is melted and drawn into a long wire of niform circular cross section. If the length fo the wire is 36 m, find its thickness.

A. 2cm

B. 1.5cm

C. 1.2cm

D. 1cm

Answer: D

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11. The number of planks of dimension ($4m \times 50cm \times 20cm$) that can be stored in a pit which is 16m long, 12m wide and 4m deep is.

A. 1900

B. 1920

C. 1800

D. 1840

Answer: B

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12. If the radius of a sphere is increased by 10%, then the volume will be increased by (a) 33.1% (b) 30% (c) 50% (d) 10%

A. 11.1 %

B. 22.1 %

C. 33.1 %

D. 44.1 %

Answer: C

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13. In a cylinder, if radius is doubled and height is halved, curved surface area will be halved (b) doubled (c) same (d) four times

A. halved

B. doubled

C. same

D. four times

Answer: C

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14. Two cubes have their volumes in the ratio 1

: 27 . The ratio of their surface areas is

A. $1 : 3$

B. $1 : 8$

C. $1 : 9$

D. $1 : 18$

Answer: C

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15. A cone is 8.4 cm heigh and the radius of its base is 2.1 cm. It is melted and recast into a sphere. The radius of the sphere is

A. 4.2cm

B. 2.1cm

C. 2.4cm

D. 1.6cm

Answer: B

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16. If the length of a diagonal of a cube is

$8\sqrt{3}\ cm$, then its surface area is $512\ cm^2$ (b)

$384\ cm^2$ (c) $192\ cm^2$ (d) $768\ cm^2$

A. $768cm^2$

B. $512cm^2$

C. $384cm^2$

D. $192cm^2$

Answer: C

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17. The total surface area of a cube is $96cm^2$.

The volume of the cube is

A. $8cm^3$

B. $512cm^3$

C. $64cm^3$

D. $27cm^3$

Answer: C

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18. If each side of a cube is doubled then its volume

A. Becomes doubled

B. Becomes 4 times

C. becomes 6 times

D. become 8 times

Answer: D

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19. In a sphere is inscribed in a cube, find the ratio of the volume of cube to the volume of the sphere.

A. $6:\pi$

B. $3:\pi$

C. $2:\pi$

D. $3:2\pi$

Answer: A

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20. If each edge of a cube is increased by 50%,
the percentage increase in its surface area is
50% (b) 75% (c) 100% (d) 125%

A. 50 %

B. 75 %

C. 100 %

D. 125 %

Answer: D

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21. The lateral surface area of a cube is $256cm^2$. Find its volume.

22. A matchbox measures $4\,cm \times 2.5\,cm \times 1.5\,cm$. What will be the volume of a packet containing 12 such boxes

23. The ratio of height of two cylinders is 5:3, as well as the ratio of their radii is 2:3. find the ratio of the volumes of the cylinders.

24. Find the area of canvas required for a conical tent of height 24m and base radius 7m.

25. Find the ratio of the total surface area of a sphere and a hemisphere of same radius.

26. The surface area of the cuboid is 1372 sq. cm. if its dimension are in the ratio of 4:2:1. then find its length.

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27. If the radius and slant height of a cone are a r/2 and 2l. Then find its total surface area.

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28. A cone and a hemisphere have equal bases and equal volumes. Find the ratio of their heights.

29. The radius of hemispherical balloon increases from 6cm to 12 cm as air is being pumped into it. The ratio of the surface areas of the balloons in two cases is

30. The largest possible right circular cone is cut out of a cube of edge r cm. what is the volume of cone?

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1. A reactangular sheet of dimension $33cm \times 18cm$ is rolled along its breadth to form a cylinder. Find the radius of the cylinder.

2. A roller 1.5 m long has a diameter of 70cm. How many revolutions will it make to level a play gound measuring $50m \times 33m$?

3. The dimensions of a cuboid are in the ratio of 1 : 2 : 3 and its total surface area is $88m^2$ .Find the dimensions.

4. A solid cylinder has a total surface area of $231\ cm^2$. Its curved surface area is $\dfrac{2}{3}$ of the total surface area. Find the volume of the cylinder.

5. The total surface area of a cube is 150sq. Cm. find the perimeter of any one of its faces.

6. Three metal cubes whose edges measure $3cm$, $4cm$ and $5cm$ respectively are melted to form a single cube. Find its edge. Also, find the surface area of the new cube.

7. The length, breadth and height of a room are 5 m, 4 m and 3 m respectively. Find the

cost of white washing the walls of the room and the ceiling at the rate of $Rs\ 7.\ 50\ per\ m^2.$

8. Three spheres of radii 3 cm, 4 cm and 5 cm are melted to form a new sphere. Find the radius of the new sphere.

9. The curved surface area of a cylinder is $176cm^2$ and its base area is $38.5cm^2$. Find the volume of the cylinder.

10. A cylinder and a cone have the same height and the same radius. The volume of the cylinder is $24cm^3$. What will be the volume of the cone?

11. What is the volume of the largest cone that can be inscribed completely in a hollow hemisphere of radius 7 cm?

12. Find the maximum length of the rod that can be placed ina cuboid of dimensions $22.5cm \times 7.5cm \times 10cm$.

13. Which of false in case of a hollow cylinder.

Write the correct answer.

A. cuved surfacea area of a hollow cylinder

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

B. Total surface area of a hollow cyloinder

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

C. Inner cuved surface area of a hollow

cylinder $= 2\pi h(R - r)$

D. Area of each end of a hollow cylinder

$$= \pi\left(R^2 - r^2\right)$$

Answer: c

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14. Which is false? Write the correct answer.

A metal pipe is 63cm long. Its inner diameter is 4cm and the outer diameter is 4.4 cm. then

A. Its inner cuved surface area $= 792cm^2$

B. Its   outer   curved   surface   area

$$= 871.2cm^2$$

C. Surface area of each end=$2.64cm^2$

D. Its total surface area=$1665.84cm^2$

Answer: d

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15. Which is false? Write the correct answer.

A. Volume of the hollow sphere

$$= \frac{4}{3}\pi\left(R^3 - r^3\right)$$

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

C. Total surface area of a hemisphere

$$= 3\pi r^2$$

D. Curved surface area of a hemisphere

$$= \pi r^2$$

Answer: d

16. Which is false? Write the correct answer.

For a right circular cylinder of base radius=7cm

and height =14cm

A. curved surface area$=616cm^2$

B. Total surface area $= 924cm^2$

C. Volume $= 2156cm^3$

D. Totl area of the end face $= 154cm^2$

Answer: d

17. Write true or false.

The largest possible right circularr cone is cut out of a cube of edge r cm. the volume of the cone is $\dfrac{1}{12}\pi r^3$ (T/F).

Part C

1. A cuboidal vessel is 10 m long and 8 m wide. How high must it be made to hold 380 cubic

metres of a liquid?

2. A wall of length 10 m was to be built across an open ground. The heightof the wall is 4 m and thickness of the wall is 24 cm. If this wall is to be built up with bricks whose dimensions are $24 \ cm \ \times \ 12 \ cm \ \times \ 8 \ cm$, how

3. $1cm^3$ of gold is drawn into a wire 0.1 mm in diameter. Find the length of the wire.

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4. A hemisphereical bowl of internal diameter 36cm contains a liquid. This liquid is to be filled in cylindrical bottles of radius 3cm and height 6cm. How many bottles are required to empty.

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5. Find the lateral curved surface area of a cylindrical petrol storage tank that is 4.2 m in diameter and 4.5 m high. How much steel was actually used, if $\dfrac{1}{12}$ of steel actually used was wasted in making the closed tank?

6. Water in a canal, $30\ dm\ wide\ and\ 12dm\ deep,$ is flowing with a velocity of $20km\ per\ hour.$ How many area will

it irrigate in $30 \, m \in$, if $9 \, cm$ of standing water is desired?

7. The radius of a sphere is 10cm. If the radius is increased by 1cm, then prove that volume of the sphere is increased by 33.1%.

8. The diameter of a hemisphere is decreased by 30%. What will be the percentage change in its total surface area?

9. The radius of a spherical ball of iron is 1.5 cm. It is melted and recast into three spherical balls. If the radii of two such balls are 0.75 cm and 1 cm, then find the radius of 3rd ball.

10. The volume of a sphere is $4851 cm^3$. How much should it radius be reduced so that it's volume becomes $\frac{4312}{3} cm^3$?

11. A semicircular sheet of paper of diameter 14 cm is bent to form an open conical cup. Find the capacity of the cup.

12. State Whether TRUE or FALSE:

If c, t and v are curved surface area, total surface area and volume of a cylinder then show that

$$th^2 = ch^2 + 4v^2 = 8v^2rh$$

Where r and h are radius and height.

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Part D

1. A cuboidal tank can store 5040 litres of water. The external dimensions of the tank are $2.2m \times 1.7m \times 1.7m$. If the wall of the tank are 5 cm thick, then what is the thickness of the bottom of the tank?

2. A metallic sheet is of the rectangular shape with dimensions $48cm \; x \; 36cm$. From each one of its corners, a square of $8cm$ is cut off. An

open box is made of the remaining sheet. Find the volume of the box.

3. A right triangle having side 6cm, 8 cm and 10cm is revolved about the side of length 8cm. Find the volume of the solid so formed.

4. A right circular cone is 5.4cm high and radius of its base is 2cm. It is melted and recast into another right circular one with radius of base as 1.5 cm. find the height of new cone formed.

5. A cylindrical tub of radius 12 cm contains water to a depth of 20 cm. A spherical iron ball is dropped into the tub and thus the level of

water is raised by 6.75 cm. What is the radius of the balls ?

6. A cylinder is within the cube touching all the vertical faces. A cone is inside the cylinder. If their heights are same with the same base, find the ratio of their volumes.

7. A plot of land in the form of a rectangle has a dimension $240m$ x $180m$. A drainlet $10m$ wide is dug all around it (on the outside) and the earth dug out is evenly spread over the plot, increasing its surface level by $25\ cm$. Find the depth of the drainlet.

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8. A residential colony has a population of 5400 and 60 litres of water is required per

person per day. For the effective utilization of rain water, a group of people decided to the WATER HARVESTING. They constructed a water reservoir measuring $48m \times 27m \times 25m$ to collect the rain water. For How many days the water of this tank is sufficient if during rain, the height of water level is 5m ?

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9. 50 students of class IX planned a visit to an old age home and to spend the whole day

with its inmates. Each one prepared a cylinderical flower vase using card board to gift the inmates. The radius of cylinder is 4.2 cm and the height is 11.2 cm.

What is the amount spent for purchasing the card board at the rate of 20 per $100m^2$.

10. Rahul wanted to make a temporary shelter for street dogs, by making a box like structure with tarpaulin that covers all the four sides

and the top of the house. How much tarpaulin would be required to make the shelter of heigh 2.5m with base dimensions $4m \times 3m.$ assuming stiching margin is negligible.

11. Twenty seven solid iron spheres, each of radius r and surface area S are melted to form a sphere with surface area $S'.$ Find the (i) radius r' of the new sphere, (ii) ratio of $S\ and\ S'.$

12. The diameter of a metallic ball is 4.2 cm. What is the mass of the ball, if the density ofthe metal is $8.9\ g\ per\ cm^3$?

13. A lead pencil consists of a cylinder of wood with a solid cylinder of graphite filled in the interior. The diameter of the pencil is 7 mm and the diameter of the graphite is 1 mm. If

the length of the pencil is 14 cm, find the volume of the wood

14. A soft drink is available in two packs (i) a tin can with a rectangular base of length 5 cm and width 4 cm, having a height of 15 cm and (ii) a plastic cylinder with circular base of diameter 7 cm and height 10 cm. Which container has greater ca

15. A bus stop is barricaded from the remaining part of the road, by using 50 hollow cones made of recycled card-board. Each cone has a base diameter of 40cm and height 1m. If the outer side of each of the cones is to be painted and the cost of painting is Rs. 12 per m^2 , what will be the cost of painting all these cones $\left(Use\pi = 3.\,14 and\sqrt{1.\,04} = 1.\,02)\right)$

16. A sphere of diameter 6 cm is dropped in a right circular cylindrical vessel partly filled with water. The diameter of the cylindrical vessel is 12 cm. If the sphere is completely submerged in water, by how much will the level of water rise in the cylindrical vessel?

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17. Mearbles of diameter 1.4 cm are dropped into a cylindrical beaker of diameter 7 cm,

containing some water. Find the number of marbles that should be dropped into the beaker so that the water level rises by 5.6 cm.

18. A toy is in the form of a cone mounted a hemisphere of diameter 7 cm. the total height of the toy is 14.5 cm. find the volume and the total surface area of the toy. (Take $\pi = \dfrac{22}{7}$).

19. If h, c, V are respectively the height, the curved surface and the volume of a cone, prove that $3\pi Vh^3 - C^2h^2 + 9V^2 = 0$.

20. A wooden box with dimensions $36cm \times 24cm \times 12cm$ is 2cm thick. Find the weight of the wood if density of the wood is $100gm/m^3$

21. A rectangular reservoir is $120m$ and $75m$ wide. At what speed per hour must water flow into it through a square pipe of $20cm$ wide so that the water rises by $2.4m$ in $18 hours.$

22. A hemispherical bowl is to be painted from inside at the rate of Rs. 20 per $100m^2$. The total cost of painting is Rs. 30.80. find

(i) Inner surface area of the bowl.

(ii) Volume of air inside the bowl.

23. If volume of two spheres are in the ratio

64: 27, then the ration of their surface area is

24. A cube of side 4cm contains a sphere

touching its side. Find the volume of the gap

in between.

25. A sphere and a right circule cylinder of the same radius have equal volume. By what percentage does the diameter of the cylinder exceed its height ?

Practice Test

1. If l,b and h are the length, breadth and height of a room then what will be the total area of the four walls?

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2. The volume of a sphere is $310.4cm^3$. Find its radius.

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3. The circumference of the base of a cylinder is 30.8 cm. its curved surface area is $289.52cm^2$. Find the height of the cylinder.

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4. The side of a cube is double the length of the cuboid. The breadth and height of the cuboid are half of its length. Find the ratio of the curved surface area of the cube to cuboid.

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5. The seed ofa corn has dimensions $1.8cm \times 0.8cm \times 0.2cm$. The height of the corn-tube is 13.7 cm and its radius is 4.2 cm. assuming that the corn-seeds have negligible distance between them and all seeds are of same size, find the number of seeds on the corn-tube.

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6. The length, breadth and height of cuiboid are increased by 30%. Find the percentage increase in the total surface area.

7. Ajay prepared a dish and kept it in a hemispherical bowl of 30cm diameter. He distributed the dish in cylinder cups of diameter 5 cm and height 4cm among his

friends and himself. How many friends were with ajay?

8. A river 15 m deep 50 m wide is flowing at the rate of 2 cm per second. How many litres of water will fall from the river into the sea in 9 hours ?