MATHS

BOOKS - RS AGGARWAL MATHS (HINGLISH)

VOLUME AND SURFACE AREA OF SOLIDS

Solved Examples

1. Find the volume the total surface area and the lateral surface area of a cuboid which is 8 m long, 6 m broad and 3.5 m high.

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2. How many bricks will be required for a wall which is 8 m long, 6 m high and 22.5 cm thick if each brick measures 28 cm $\times$ 11.25 cm $\times$ 6 cm?

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3. Find the length of the longest road that can be placed in a room of dimensions $(10m \times 10m \times 5m)$

A. $= 14m$

B. $= 13m$

C. $= 12m$

D. $= 15m$

Answer: D

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4. A field is 80 m long and 50 m broad. In one corner of the field, a pit which is 10 m long, 7.5 m broad and 8 m deep has been dug out. The earth taken out of it is evelny spread over the remaining part of the field. Find the rise in the level of the field.

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5. The volume of a rectangular pool is $182m^3$. If its length and breadth be 8 m abd 6.5 m

respectivley. Find its depth.

A. 2.5 cm

B. 4.5 cm

C. 3.5 cm

D. 5.5 cm

Answer: C

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6. Water is pouring into a cubiodal reservoir at the rate of 60 litres per minute. If the volume of reservoir is 108 {m^3}

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7. Find the volume of wood used to make a closed rectangular box of outer dimensions $60cm \times 45cm \times 32cm$, the thickness of wood being 2.5 cm all around. Also find the capacity of the box.

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8. An open rectangular cistern when measured from outside is 1.35 m long, 1.08 m broad and 90 cm deep. It is made up of iron, which is 2.5 cm thick. Find the capacity of the cistern and the volume of the iron used.

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9. Find the volume, laterial surface area and the total surface area of a cube each of whose sides

measures 8 cm.

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10. Find the volume of a cube whose total surface area is $486cm^2$.

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11. Find the total surface area of the cube whose volume is $343cm^3$

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12. Find the volume, curved surface area and the total surface area of a cylinder having base radius 10.5 cm and height 18 cm.

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13. The circumference of the base of a cylinder is 176 cm and its height is 65 cm. find the volume of the cylinder and its lateral surface area.

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14. A cylindrical tank has a capacity of $5632m^3$. If the diameter of its base is 16 m, find its depth.

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15. A rectangular paper of width 14 cm is rolled along its width and a cylinder of radius 20 cm is formed. Find the volume of the cylinder (Fig 11.45)? (Take  \frac{{22}}{7}

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16. A rectangular piece of paper $22cm \times 6cm$ is folded without overlapping to make a cylinder of height 6cm. Find the volume of the cylinder.

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17. How many cubic metres of earth must be dug to sink a wll which is 16 m deep and which has a radius of 3.5 m? If the earth taken out is spread over a rectangular plot of dimensions $25m \times 16m$, what is the height of the platform so formed?

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18. A closed metallic cylinderica bos is 1.25 m high and it has a base whose radius is 35 cm. If the sheet ofmetal costs Rs. 80 per m^2, then find the cost of the material used in the box. Also, find the capacity of the box in litres.

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19. An iron pipe is 21 m long and its exterior diameter is 8 cm. If the thickness of the pipe is 1 cm and iron weight is 8 g/cm' find the weight of pipe.

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Exercise 20 A

1. Find the volume, lateral surface area and the total surface area of the cuboid whose

dimensions are

(i) length =22 cm, breadth = 12 cm and height =7.5 cm

(ii) length =15 m, breadth =6 m and height =9dm

(iii) lenth =24m, breadth =25 cm and height =6m

(iv) length =48 cm, breadth =6 dm and height =1 m

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2. The dimesions of a rectangular water tank are 2m 75 cm by 1 m 80 cm by 1 m 40 cm. how many

litres of water does it hold when filled to the brim?

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3. A solid rectangular piece ofiron measures $1.05m \times 70cm \times 1.5cm$. Find the weight of this piece in kilograms. If $1cm^3$ of iron weighs 8 grams.

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4. The area of a courtyard is 3750 m^3. Find the cost of covering it with gravel to a height of 1 cm if the gravel costs Rs. 6.40 per cubic metre.

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5. How many persons can be accommodated in a hall of length 16m, breadth 12.5 m and height 4.5 m, assuming that $3.6m^3$ of air is required for each person?

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6. A carboard box is 1.2 m long, 72 cm wide and 54 cm high. How many bars of soap can be put into it if each bar measures $6cm \times 4.5cm \times 4cm$?

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7. The size of a match box is $4cm \times 2.5cm \times 1.5cm$. What is the volume of a packet containing 144 matchboxes? How many

such packets can be placed in a carton of size $1.5m \times 84cm \times 60cm$?

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8. How many planks of size $2m \times 25cm \times 8cm$ can be prepared from a wooden block 5 m long, 70 cm broad and 32 cm thick, assuming that there is no wastage?

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9. How many bricks, each of size $25cm \times 13.5cm \times 6cm$, will be required to build a wall 8 m long, 5.4 m high and 33 cm thick?"

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10. A wall 15 m long, 30 cm wide and 4m high is made of bricks, each measuring $(22cm \times 12.5cm \times 7.5cm)$. If $\frac{1}{12}$ of the total volume of the wall consits of mortar, how many bricks are there in the wall ?

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11. Find the capacity of a rectangula cistern in litres whose dimensions are $11.2m \times 6m \times 5.8m$. Find the area of the iron sheet required to make the cistern.

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12. The volume of a block of gold is 0.5 m^3. If it is hammered into a sheet to cover an area of 1 hectare, find the thickness of the sheet.

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13. In a shower , 5 cm of rain falls . The volume of the water that falls on 2 hectares of ground , is

A. $10000m^3$

B. $100m^3$

C. $2000m^3$

D. $1000m^3$

Answer: D

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14. If a river of depthness 2 metres and breadth 45 metress, flowrs at a speed of 3 km per hours, then find the quanity of water that will fall from the river to the sea in 1 minute.

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15. A pit 5 m long and 3.5 m wide is dug to a certain depth. If the volume of earth taken out of it is $14m^3$, what is the depth of the pit?

A. 40 cm

B. 50 cm

C. 80 cm

D. none of these

Answer: C

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16. A rectangular water tank is 90 cm wide and 40 cm deep. If it can contain 576 litres of water. What is its length?

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17. A beam, of wood is 5 m long and 36 cm thick. It is made of $1.35m^3$ of wood. What is the width of the beam?

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18. The volume of a room is $378m^3$ and the area of its floor is $84m^2$. Find the height of the room.

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19. A swimming pool is 260 m long and 140 m wide. If 54600 cubic metres of water is pumped into it, find the height of the water level in it.

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20. Find the volume of wood used to make a closed box of outer dimensionis $60cm \times 45cm \times 32cm$, the thickness of wook beign 2.5 cm all around.

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21. Find the volume of iron required to make an open box whose external dimensions are $36cm \times 25cm \times 16.5cm$, the box beign 1.5 cm thick throughout. If $1cm^3$ of iron weighs 8.5 grams, find the weight of the empty box in kilograms.

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22. A box with a lid is made of wood which is 3 cm thick. Its external length, bredth and height are 56 cm, 39 cm and 30 cm respectivley. Find the capacity of the box. Also find the volume of wood used to make the box.

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23. The external dimensions of a closed wooden box are 62 cm, 30 cm and 18 cm. If the box is

made of 2-cm-tick wood, find the capacity of the box.

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24. An open wooden box 80 cm long, 65 cm wide and 45 cm high, is made of 2.5 cm thick wood. Find (i) the capacity of the box, (ii) volume of wood used and (iii) weight of the box, it being givne that 100 cm^3 of wood weight 8g

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25. Find the volume, lateral surface area and the total surface area of a cube each of whose edges measures (i) 7m (ii) 5.6 cm (iii) 8 dm, 5 cm

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26. The total surface area of a cube is $1176cm^2$. Find its volume

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27. If the volume of a cube is $729cm^3$,then its surface area will be:

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28. The dimensions of a metal block are 2.25m by 1.5m by 27cm. It is melted and recast into cubes, each of the side 45cm. How many cubes are formed?

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29. If each edge of a cube is doubled, (i) how many times will its surface area increase? (ii) how many times will its volume increase?

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30. A solid cubical block of fine wood costs Rs. 256 at Rs. 500 per m^2. Find its volume and the length of each side.

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Exercise 20 B

1. Find the volume, curved surface area and total surface area of each of the cylinders whose dimensions are:

(i) radius of the base =7cm and height =50 cm

(ii) radius of the base =5.6 m and height =1.25 m

(iii) radius of the base k=14 dm and height =15 m

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2. A milk tank is in the form of a cylinder whose radius is 1.5 m and height is 10.5 m. find the quantity of milk in litres that can be stored in tank.

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3. A wooden cylinderical pole is 7 m high and its base radius is 10 cm. Find its weight if the wood weighs 225 kg per cubic metre.

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4. Find the height of the cylinder whose volume is $1.54m^3$ and diameter of the base is 140 cm?

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5. The volume of a circular iron rod of length 1 m is $3850cm^3$. Find its diameter.

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6. A closed cylindrical tank of diameter 14 m and height 5 m is made form a sheet of metal. How much sheet of metal will be required?

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7. The circumference of the base of a cylinder is 88 cm and its height is 60 cm. Find the volume of the cylinder and its curved surface area.

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8. The lateral surfac area of a cylinder of length 14 m is $220m^2$. Find the volume of the cylinder.

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9. The volume of a cylinder of height 8 cm is 1232cm^(3). Find its curved surface area and the total surface area.

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10. The radius and height of a cylinder are in the ratio $7:2$. If the volume of the cylinder is $8316cm^3$, find the total surface ara of the cylinder.

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11. The curved surface area of a cylinder is $4400cm^2$ and the circumference of its base is 110 cm. Find the volume of the cylinder.

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12. A particular brand of talcum powder is available in two packs, a plastic can with a square base of side 5 cm and of height 14 cm, or one with a circular base os rdius 3.5 cm and of height 12 cm. Which of them has greater capacity and by how much?

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13. Find the cost of painting 15 cylinderical pillars of a building at Rs. 2.50 per square metre if the

diameter and height of each pillar are 48 cm and 7 metres respectively.

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14. A rectangular vessel 22 cm by 16 cm by 14 cm is full of water. If the total water is poured into the empty cylindrical vessel of radius 8 cm, find the height of water in the cylinderical vessel.

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15. A piece of ductile metal is in the form of a cylinder of diameter 1cm and length 5cm. It is drawnout into a wire of diameter 1mm. What will be the length of the wire so formed?

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16. A solid cube of metal each of whose sides measures 2.2 cm is melted to form a cylindrical wire of radius 1 mm. find the length of the wire so obtained.

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17. How many cubic meters of earth must be dug out to sinc a well 20m deep and has a diameter of 7m ? If the earth so dug out spread over a rectangular plot of 25m by 11m, What is height of the platform so formed ?

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18. A well of inner diameter 14 m is dug 12 m deep. The earth taken out of it has been spread

evenly all around it in the shape of a circular ring of width 7 m to form an embankment. Find the height of the embankment.

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19. A road roller takes 750 complete revolutions to move once over to level a road. Find the area of the road if the diameter of a road roller is 84 cm and length is 1 m.

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20. A cylinder is open at both ends and is made of 1.5 cm thick metal. Its external diameter is 12 cm and height is 84 cm. What is the volume of metal used in making the cylinder? Also, find the weight of the cylinder if $1cm^3$ of the metal weighs 7.5 g.

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21. The length of a metallic tube is 1 metre, its thickness is 1 cm and its inner diameter is 12 cm.

Find the weight of the tube if the density of the metal is 7.7 grams per cubic centimetre.

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Exercise 20 C Objective Questions

1. The maximum length of a pencil that can be kept in a rectangula box of dimensions $12cm \times 9cm \times 8cm$ is

A. 13 cm

B. 17 cm

C. 18 cm

D. 19 cm

Answer: B

2. The total surface area of a cube is $150cm^2$. Its volume is

A. $216cm^3$

B. $125cm^3$

C. $64cm^3$

D. $1000cm^3$

Answer: B

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3. The volume of a cube is $343cm^3$. Its total surface area is

A. $196cm^2$

B. $49cm^2$

C. $294cm^2$

D. $147cm^2$

Answer: C

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4. The cost of painting the whole surface area of cube at the rate of 10 paise per cm^2 is Rs. 264.60. Then, the volume of the cube is

A. $6859cm^3$

B. $9261cm^3$

C. $8000cm^3$

D. $10648cm^3$

Answer: B

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5. How many bricks, each measuring $25cm \times 1.25cm \times 6cm$, will be needed to build a wall 8 m long, 6m high and 22.5 cm thick?

A. 5600

B. 6000

C. 6400

D. 7200

Answer: C

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6. How many cubes of 10 cm edge can be put in a cubical box of 1 m edge?

A. 10

B. 100

C. 1000

D. 10000

Answer: C

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7. The edges of a cuboid are in the ration 1:2:3 and its surface ara is $88cm^2$. The volume of the cuboid is

A. $48cm^3$

B. $64cm^3$

C. $96cm^3$

D. $120cm^3$

Answer: A

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8. Two cubes have their volume in the ratio $1:27$.

The ratio of their surface areas is

A. $1:3$

B. $1:9$

C. $1:27$

D. None of these

Answer: B

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9. The surface area of a $(10cm \times 4cm \times 3cm)$ brick is

A. $84cm^2$

B. $124cm^2$

C. $164cm^2$

D. $180cm^2$

Answer: C

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10. A beam 9 m long, 40 cm wide and 20 cm high is made up of iron which weight 50kg per cubic metre. The weight of the beam is

A. 56 kg

B. 48 kg

C. 36kg

D. 27 kg

Answer: C

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11. A rectangular water reservoir contains 42000 litres of water. If the length of reservoir is 6 m

and its breadth is 3.5 m. The depth of the reservoir is

A. 2m

B. 5m

C. 6m

D. 8m

Answer: A

12. The dimensions of a room are (10 m x 8m x 3.3 m). How many men can be accommodated in this room if each man required $3m^3$ of space

A. 99

B. 88

C. 77

D. 75

Answer: B

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13. A rectangular water tank is 3m long, 2m wide and 5 m high. How many litres of water can it hold?

A. 30000

B. 15000

C. 25000

D. 35000

Answer: A

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14. The area of the cardboard needed to make a box is size $25cm \times 15cm \times 8cm$, will be

A. $390cm^2$

B. $1390cm^2$

C. $2780cm^2$

D. $1000cm^2$

Answer: B

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15. The diagonal of a cube measures $4\sqrt{3}cm$. Its volume is

A. $8cm^3$

B. $16cm^3$

C. $27cm^3$

D. $64cm^3$

Answer: D

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16. The diagonal of a cube is $9\sqrt{3}$ cm long. Its total surface area is

A. $243cm^2$

B. $486cm^2$

C. $324cm^2$

D. $648cm^2$

Answer: B

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

A. is doubled

B. becomes 4 times

C. becomes 6 times

D. becomes 8 times

Answer: D

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18. Three cubes of iron whose edges are 6 cm, 8 cm and 10 cm respectively are melted and formed into a single cube. The edge of the new cube formed is

A. 12 cm

B. 14 cm

C. 16 cm

D. 18 cm

Answer: A

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19. Five equal cubes, each of edge 5 cm, are placed adjacent to each other. The volume of the cuboid so formed, is

A. $125cm^3$

B. $375cm^3$

C. $525cm^3$

D. $625cm^3$

Answer: D

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20. A circular well with a diameter of 2 metres, is dug to a depth of 14 metres. What is the volume of the earth dug out? (a) 32 m3 (b) 36 m3 (c) 40 m3 (d) 44 m3

A. $32m^3$

B. $36m^3$

C. $40m^3$

D. $44m^3$

Answer: D

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21. If the capacity of a cylindrical tank is $1848m^3$ and the diameter of its base is 14 m, the depth of the tank is

A. 8 m

B. 12 m

C. 16 m

D. 18 m

Answer: B

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22. The ratio of total surface area to lateral surface area of a cylinder whose radius is 20 cm and height 60 cm, is

A. $2:1$

B. $3:2$

C. $4:3$

D. $5:3$

Answer: C

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23. The number of coins, each of radius 0.75 cm and thickness 0.2 cm, to be melted to make a right circular cylinder of height 8 cm and base radius 3 cm is

A. 460

B. 500

C. 600

D. 640

Answer: D

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24. 66 cubic centimetres of silver is drawn into a wire 1 mm in diameter. The length of the wire in metres will be (a) 84 (b) 90 (c) 168 (d) 336

A. 78 m

B. 84 m

C. 96 m

D. 108 m

Answer: B

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25. The height of a cylnder is 14 cm and its diameter is 10 cm. The volume of the cylinder is

A. $1100cm^3$

B. $3300cm^3$

C. $3500cm^3$

D. $7700cm^3$

Answer: A

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26. The height of a cylinder is 80 cm and the diameter of its base is 7 cm. The whole surface area of the cylinder is

A. $1837cm^2$

B. $1760cm^2$

C. $1942cm^2$

D. $3080cm^2$

Answer: A

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27. The height of a cylinder is 14 cm and its curved surface area is $264cm^2$. The volume of the cylinder is

A. $308cm^3$

B. $396cm^3$

C. $1232cm^3$

D. $1848cm^3$

Answer: B

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28. The diameter of a cylinder is 14 cm and its curved surface area is $220cm^2$, the volume of the cylinder is

A. $770cm^3$

B. $1000cm^3$

C. $1540cm^3$

D. $6622cm^3$

Answer: A

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29. The ratio of the radii of two cylinder s is $2:3$ and the ratio of their heights is 5:3. The ratio of their volumes will be

A. $4:9$

B. $9:4$

C. $20:27$

D. $27:20$

Answer: C

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Test Paper 20

1. Find the volume of a cube whose total surface area is $384cm^2$.

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2. How many soap cakes each measuring $7cm \times 5cm \times 2.5cm$ can be placed in a box of size $56cm \times 40cm \times 25cm$

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3. The radius and height of a cylinder are in the ratio $5:7$ and its volume is $550cm^3$. Find its radius and height.

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4. Find the number of coins, 1.5 cm in diameter and 0.2 cm thick, to be melted to form a right circular cylinder of height 10 cm and diameter 4.5 cm.

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5. Find the surface ara of a chalk box, whose length, breadth and height are 18 cm, 10 cm, and 8 cm respectively.

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6. The curved surface area of a cylindrical pillar is $264\,m^2$ and its volume is $924\,m^3$. Find the diameter and the height of the pillar.

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7. The circumference of the circular base of a cylinder is 44 cm and its height is 15 cm. The volume of the cylinder is

A. $1155cm^3$

B. $2310cm^3$

C. $770cm^3$

D. $1540cm^3$

Answer: B

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8. The area of the base of a circular cylinder is $35cm^2$ and its heigh is 8 cm The volume of the cylinder is

A. $140cm^3$

B. $280cm^3$

C. $420cm^3$

D. $210cm^3$

Answer: A

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9. A cuboid having dimensions $16m \times 11m \times 8m$ is melted to form a cylinder of radius 4 m. What is the height of the cylinder?

A. 28 m

B. 14 m

C. 21 m

D. 32 m

Answer: A

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10. The dimensions of a cuboid are $8m \times 6m \times 4m$.Its lateral surface area is

A. $210m^2$

B. $105m^2$

C. $112m^2$

D. $240m^2$

Answer: C

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11. The length breadth and height of a cuboid are in the ratio $3:4:6$ and its volume is $576cm^3$. The whole surface area of the cuboid is

A. $216cm^2$

B. $324cm^2$

C. $432cm^2$

D. $460cm^2$

Answer: A

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12. If l,b,h be the length, breadth and height of a cuboid, then its whole surface area =(.....) sq units.

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13. If l,b,h be the length, breadth and height of a cuhoid, then its lateral surface area =(.....)sq units.

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14. If each side of a cube is a, then its lateral surface area is ..... Sq. units.

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15. If r is the radius of the base and h be the height of a cylinder, then its volume is (.....) cubic units.

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16. If r is the radius of the base and h be the height of a cylinder, then its lateral surface area is (.....) sq units.

A. $2\pi r^2 h$

B. $2\pi r h$

C. $4\pi r h$

D. $\pi r h$

Answer: B

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