



## MATHS

### BOOKS - RD SHARMA MATHS (ENGLISH)

#### SURFACE AREA AND VOLUME OF A CUBOID AND CUBE

Others

1. A match box measures  $4\text{cm} \times 2.5\text{cm} \times 1.5\text{cm}$ .

What will be the volume of a packet containing 12 such boxes?



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2. The paint in a certain container is sufficient to paint on area equal to  $9.375m^2$ . How many bricks of dimension  $22.5cm \times 10cm \times 7.5cm$  can be painted out of this container?



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3. Length of a class-room is two times its height and its breadth is  $1\frac{1}{2}$  times its height. The cost of white-washing the walls at the rate of

$Rs.1.60perm^2$  is  $Rs.179.20$ . Find the cost of tiling the floor at the rate of  $Rs.6.75perm^2$ .



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4. A cuboid has total surface area of  $40m^2$  and its lateral surface area is  $26m^2$ . Find the area of its base.



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5. The cost of preparing the walls of room 12m long at the rate of Rs. 1.35 per square metre is RS.

340.20 and the cost of matting the floor at 85 paise per square metre is Rs. 91.80. Find the height of the room.



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6. Ravish wanted to make a temporary shelter for his car by making a box-like structure with tarpaulin that covers all the four sides and the top of the car (with the front face as a flap which can be rolled up). Assuming that the stitching margins are very small, and therefore negligible, how much

tarpaulin would be required to make the shelter of height  $2.5m$  with base dimensions  $4m \times 3m$ ?



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7. A wooden bookshelf has external dimensions as follows:

*Height = 110cm, Depth = 25cm, Breadth = 85cm*

(See Figure). The thickness of the plank is  $5cm$  everywhere. The external faces are to be polished and the inner face are to be painted. If the rate of polishing is  $20paise\text{per}\text{cm}^2$  and if the rate of

painting is  $10\text{paisepercm}^2$ . Find total cost of expenses.



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8. The length and bredth of a hall are in the ratio 4:3 and its height is  $5.5\text{metres}$ . The cost of decorating its walls (including doors and windows) at  $\text{Rs.}6.60\text{persquaremetre}$  is  $\text{Rs.}5082$ .

Find the length and breadth of the room.



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9. A cubical box has each edge  $10\text{cm}$  and another cuboidal box is  $12.5\text{cm}$  long,  $10\text{cm}$  wide and  $8\text{cm}$  height, find difference in their lateral surface area.



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



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11. Find the surface area of a chalk box whose length, breadth and height are  $16\text{cm}$ ,  $8\text{cm}$ , and  $6\text{cm}$ , respectively.



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12. A swimming pool is  $20\text{m}$  in length,  $15\text{m}$  in breadth, and  $4\text{m}$  in depth. Find the cost of cementing its floor and walls at the rate of Rs. 12 per square metre.



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**13.** A cuboidal oil tin is  $30\text{cm} \times 40\text{cm} \times 50\text{cm}$  . Find the cost of the tin required for making 20 such tins if the cost of tin sheet is  $Rs.20$  per square metre.



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**14.** A plastic box  $1.5\text{m}$  long,  $1.25\text{m}$  wide and  $56\text{cm}$  deep is to be made. It is to be open at the top. Ignoring the thickness of the plastic sheet, determine: The area of the sheet required for making the box. The cost of sheet for it, if a sheet measuring  $1\text{m}^2$  costs  $Rs.20$ .



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**15.** Three cubes each of side  $5\text{cm}$  are joined end to end. Find the surface area of the resulting cuboid.



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**16.** A godown measures  $40\text{m} \times 25\text{m} \times 10\text{m}$ . Find the maximum number of wooden crates each measuring  $1.5\text{m} \times 1.25\text{m} \times 0.5\text{m}$  that can be stored in the godown.



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17. A child playing with building blocks, which are of the shape of the cubes, has build a structure. If the edge of each cube is 3cm, find the volume of the structure built by the child.



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18. The capacity of a cuboidal tank is 50, 000*litres*. Find the breadth of the tank if its length and depth are respectively 2. 5*cm* and 10*m*.



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**19.** A rectangular container, whose base is a square of side 5cm, stands on a horizontal table, and holds water upto 1cm from the top. When a cube is placed in the water it is completely submerged, the water rises to the top and 2 cubic cm of water overflows. Calculate the volume of the cube and also the length of its edge.



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**20.** A box with lid is made of 2cm thick wood. Its external length, breadth and height are 25cm,

18cm and 15cm respectively. How much cubic cm of a liquid can be placed in it? Also, find the volume of the wood used in it.



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**21.** A metal cube of edge 12cm is melted and formed into three smaller cubes. If the edges of the two smaller cubes are 6cm and 8cm, find the edge of the third smaller cube.



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22. If  $V$  is the volume of a cuboid of dimensions  $a, b, c$  and  $S$  is its surface area, then prove that

$$\frac{S}{V} = 2\left(\frac{1}{a} + \frac{1}{b} + \frac{1}{c}\right)$$



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23. A rectangular water reservoir is  $10.8m \times 3.75m$  at the base. Water flows into it at the rate of  $18 \frac{m}{sec}$  through a pipe having the cross section  $7.5 \text{ cm}$  and  $4.5 \text{ cm}$ . Find the height to which the water will rise in the reservoir in 30 minutes



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**24.** The external length, breadth and height of a closed rectangular wooden box are 18cm, 10cm and 6cm respectively and thickness of wood is  $\frac{1}{2}$  cm. When the box is empty, it weight 15kg and when filled with sand it weighs 100kg. Find the weight of one cubic cm of weed and cubic cm of sand.



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25. A granary is in the shape of a cuboid of size  $8m \times 6m \times 3m$ . If a bag of grain occupies a space of  $0.65m^3$ , how many bags can be stored in the granary?



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26. A rectangular tank is 225 m by 162 m at the base. With what speed must water flow into it through an aperture 60cm by 45cm that the level may be raised 20cm in 5 hours.?



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**27.** Hameed has built a cubical water tank with lid for his house, with each outer edge 1.5 m long. He gets the outer surface of the tank excluding the base, covered with square tiles of side 25 cm. Find how much he would spend for the tiles, if the cost of the tiles is Rs 360 per dozen.



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**28.** The dimensions of a rectangular box are in the ratio of 2:3:4 and the difference between the cost of covering it with sheet of paper at the rates

of  $Rs.8$  and  $Rs.9.50perm^2$  is  $Rs.1248$ . Find the dimensions of the box.



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**29.** A plot of land in the form of a rectangle has a dimension  $240m \times 180m$ . A drain  $10m$  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  $25cm$ . Find the depth of the drain let.



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**30.** A metallic sheet is of the rectangular shape with dimensions  $48\text{cm} \times 36\text{cm}$ . From each one of its corners, a square of  $8\text{cm}$  is cutoff. An open box is made of the remaining sheet. Find the volume of the box.



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**31.** In Figure, the shape of a solid copper piece (made of two pieces with dimensions as shown in the figure) is shown. The face  $ABCDEF A$  is the uniform cross-section. Assume that the angles at

$A$ ,  $B$ ,  $C$ ,  $D$  and  $F$  are right angles. Calculate the volume of the piece.



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**32.** Water flows in a tank  $150m \cdot 100m$  at the base, through a pipe whose cross-section is  $2dm$  by  $1.5dm$  at the speed of 15 km per hour. In what time, will the water be  $3metres$  deep?



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**33.** 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?



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**34.** A rectangular tank measuring  $5m \times 4.5m \times 2.1m$  is dug in the centre of the field measuring  $13.5m \times 2.5m$ . The earth dug out is spread evenly over the remaining portion of the field. How much is the level of the field raised?



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**35.** The length of a cold storage is double its breadth. Its height is  $3\text{metres}$ . The area of its four walls (including doors) is  $108\text{m}^2$ . Find its volume.



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**36.** The cost of papering four walls of a room at  $70\text{paise}$  per square metre is  $\text{Rs.}157.50$ . The height of the room is  $5\text{metres}$ . Find the length and the breadth of the room if they are in the ratio  $4:1$ .



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**37.** The dimension of a rectangular box are in the ratio  $2:3:4$  and the difference between the cost of covering it with sheet of paper at the rate of  $Rs.4$  and  $Rs.4.50$  per square metre is  $Rs.416$ . Find the dimensions of the box.



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**38.** The length of a hall is  $20m$  and width  $16m$ . The sum of the areas of the floor and the flat roof is

equal to the sum of the areas of the four walls.

Find the height and the volume of the hall.



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**39.** The sum of length, breadth and depth of a cuboid is  $19\text{cm}$  and the length of its diagonal is  $11\text{cm}$ . Find the surface area of the cuboid.



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**40.** Find the number of bricks, each measuring  $25\text{cm} \times 12.5\text{cm} \times 7.5\text{cm}$  required to construct a



wall  $6\text{ m}$  long,  $5\text{ m}$  high and  $0.5\text{ m}$  thick, while the cement and sand mixture occupies  $\frac{1}{20}$  of the volume of the wall.



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**41.** The length of a room is one and a half times its breadth. The cost of carpeting the room at  $\text{Rs.}3.25\text{ per m}^2$  is  $\text{Rs.}175.50$  and the cost of papering the walls at  $\text{Rs.}1.40\text{ per m}^2$  is  $\text{Rs.}240.80$ . If 1 door and 2 window occupy  $8\text{ m}^2$ , find the dimensions of the room.



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**42.** Shanti Sweets Stall was placing an order for making cardboard boxes for packing their sweets.

Two sizes of boxes were required. The bigger of dimensions

$25\text{ cm} \times 20\text{ cm} \times 5\text{ cm}$  and the smaller of dimensions  $15\text{ cm} \times 10\text{ cm} \times 5\text{ cm}$



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**43.** An agricultural field is in the form of a rectangle of length  $20\text{ m}$  and width  $14\text{ m}$ . A pit  $6\text{ m}$  long,  $3\text{ m}$  wide and  $2.5\text{ m}$  deep is dug in a corner

of the field and the earth taken out of the pit is spread uniformly over the remaining area of the field. Find the extent to which the level of the field has been raised.



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**44.** Water in a canal , 30 dm wide and 12 dm deep , is flowing with a velocity of 20 km per hour. How much area will it irrigate in 30 min , if 9 cm of standing water is desired?



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**45.** Water in a rectangular reservoir having base 80m by 60m is 6.5m deep. In what time can the water be emptied by a pipe of which the cross-section is a square of side 20cm, if the water runs through the pipe at the rate of 15km/hr.



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**46.** A cube of  $9\text{cm}$  edge is immersed completely in a rectangular vessel containing water. If the dimensions of the base are  $15\text{cm}$  and  $12\text{cm}$ . Find the rise in water level in the vessel.



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**47.** Find the surface area of a chalk box whose length, breadth and height are  $16\text{ cm}$ ,  $8\text{ cm}$  and  $6\text{ cm}$ , respectively.



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**48.** Find the surface area of a cube whose edge is  $11\text{ cm}$



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**49.** The dimensions of a cuboid are in the ratio of  $1:2:3$ . So, let the dimensions be  $x, 2x, 3x$  in metres. its total surface area is  $88 \text{ cm}^2$ . find the dimensions.



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**50.** A cubical box has each edge  $10 \text{ cm}$  and another cuboidal box is  $12.5 \text{ cm}$  long,  $10 \text{ cm}$  wide and  $8 \text{ cm}$  high. find difference in their volume.



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**51.** Three cubes each of side  $5\text{cm}$  are joined end to end. Find the surface area of the resulting cuboid.



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**52.** A small indoor greenhouse (herbarium) is made entirely of glass panes (including base) held together with tape. It is 30 cm long, 25 cm wide and 25 cm high. (i) What is the area of the glass? (ii) How much of tape is needed for all the 12 edges?



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**53.** A plastic box  $1.5\text{ m}$  long,  $1.25\text{ m}$  wide and  $65\text{ cm}$  deep is to be made. It is to be open at the top. Ignoring the thickness of the plastic sheet, determine: The area of the sheet required for making the box. The cost of sheet for it, if a sheet measuring  $1\text{ m}^2$  cost  $Rs.20$



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**54.** A cuboidal oil tin is  $30\text{ cm}$  by  $40\text{ cm}$  by  $50\text{ cm}$ . Find the cost of the tin required for making 20



such times if the cost of tin sheet is  $Rs.20$  per square metre.



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**55.** Find the area of the four walls of a room whose length is  $6\text{ m}$ , breadth  $5\text{ m}$  and height  $4\text{ m}$ . Also find the cost of white-washing the walls, if the rate of white washing is  $Rs. 5$  per square meter.

(Doors, Windows and other opening ignored)



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56. A swimming pool is  $20\text{ m}$  in length,  $15\text{ m}$  in breadth, and  $4\text{ m}$  in depth. Find the cost of cementing its floor and walls at the rate of  $\text{Rs.}12$  per square metre.



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57. The floor of a rectangular hall has a perimeter of  $250\text{ m}$ . Its height is  $6\text{ m}$ . Find the cost of painting its four walls (including doors, etc.) at the rate of  $\text{Rs.}6$  per square metre.



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**58.** The floor of a rectangular hall has a perimeter  $250m$  . If the cost of painting the four walls at the rate of  $10 \text{ per } m^2$  is  $Rs.15000$ . Find the height of the hall.



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**59.** A cuboid has total surface area of the  $40 m^2$  and its lateral surface area is  $26 m^2$  . Find the area of its base.



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**60.** Length of a class room is two times its height and its breadth is  $1\frac{1}{2}$  times its height. The cost of white-washing the walls at the rate of *Rs.1.60 per  $m^2$*  is *Rs.179.20*. Find the cost of tiling the floor at the rate of *Rs.6.75 per  $m^2$*



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**61.** The length of a cold storage is double its breadth. Its height is *3 metres*. The area of its four walls (including doors) is *108  $m^2$* . Find its volume.



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**62.** The cost of papering four walls of a room at *70 paise per square meter* is *Rs.157.50*. The height of the room is *5 metres*. Find the length and the breadth of the room if they are in the ratio 4:1



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**63.** The dimension of a rectangular box are in the ratio 2:3:4 and the difference between the cost of covering it with sheet of paper at the rate of

*Rs.4 and Rs.4.50 per square meter is Rs.416.*

Find the dimensions of the box.



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**64.** The length of a hall is  $20\text{ m}$  and width  $16\text{ m}$ .

The sum of the area of the floor and the flat roof is equal to the sum of the areas of the four walls.

Find the height and the volume of the hall.



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65. The sum of length, breadth and depth of a cuboid is  $19\text{ cm}$  and length of its diagonal is  $11\text{ cm}$ . Find the surface area of the cuboid.

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66. Find the number of bricks, each measuring  $25\text{ cm} \times 12.5\text{ cm} \times 7.5\text{ cm}$  required to construct a wall  $6\text{ m}$  long,  $5\text{ m}$  high and  $0.5\text{ m}$  thick, while the cement and sand mixture occupies  $\frac{1}{20}$  of the volume of the wall.

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67. A class room is 7 m long, 6.5 m wide and 4 m high . It has one door 3m x 1.4m and three windows, each measuring 2m x 1 m. The interior wall are to be colour washed. The contractor charge Rs.5.25 per sqm. Find the cost of colour washing.



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68. The length of a room is one and a half times its breadth. The cost of carpeting the room at Rs.3.25 per  $m^2$  is Rs.175.50 and the cost of



papering the walls at  $Rs.1.40$  per  $m^2$  is  $Rs.240.80$

. If 1 door and 2 window occupy  $8 m^2$ , find the dimensions of the room.



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**69.** Shanti Sweets stall was placing an order for making card board boxes for packing their sweets. Two sizes of boxes were required. The bigger of dimensions  $25cm \times 20cm \times 5cm$  and the smaller of dimensions  $15cm \times 12cm \times 5cm$ .  $5\%$  of the total surface area is required extra, for all the overlaps. If the cost of cardboard is  $Rs.4$  for

$1000 \text{ cm}^3$ , find the cost of cardboard required for supplying 250 boxes of each kind.



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**70.** Find the lateral surface area and total surface area of a cuboid of length 80cm, breadth 40cm and height 20cm.



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**71.** Find the lateral surface area and total surface area of a cube of edge 10cm.



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**72.** Find the ratio of the total surface area and lateral surface area of a cube.



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**73.** Mary wants to decorate her Christmas tree. She wants to place the tree on a wooden block covered with coloured paper with picture of Santa Claus on it. She must know the exact quantity of paper to buy for this purpose. If the box has

length, breadth and height as 80 cm, 40 cm, and 20 cm respectively. How many square sheets of paper of side 40 cm would she require?



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**74.** The length, breadth and height of a room are 5m, 4m and 3m respectively. Find the cost of white washing the walls of the room and the ceiling at the rate of  $Rs. 7.50 m^2$ .



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**75.** Three equal cubes are placed adjacently in a row. Find the ratio of total surface area of the new cuboid to that of the sum of the surface areas of the three cubes.



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**76.** A  $4\text{ cm}$  cube is cut into  $1\text{ cm}$  cubes. Calculate the total surface area of all the small cubes.



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**77.** The length of a hall is 18m and the width 12m.

The sum of the areas of the floor and the flat roof is equal to the sum of the areas of the four walls.

Find the height of the hall.



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**78.** Hameed has built a cubical water tank with lid for his house, with each other edge 1.5m long. He gets the outer surface of the tank excluding the base, covered with square tiles of side 25cm. Find

how much he would spend for the tiles, if the cost of tiles is Rs. 360 per dozen.



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**79.** Each edge of a cube is increased by 50%. Find the percentage increase in the surface area of the cube.



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**80.** The dimensions of a rectangular box are in the ratio 2:3:4 and the difference between the cost of

covering it with sheet of paper at the rates of Rs. 8 and Rs. 9.50 per  $m^2$  is Rs. 1248. Find the dimensions of the box.



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**81.** A closed iron tank 12m long, 9m wide and 4m deep is to be made. Determine the cost of iron sheet used at the rate of Rs. 5 per metre sheet, sheet being 2 metre wide.



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**82.** Ravish wanted to make a temporary shelter for his car by making a box-like structure with tarpaulin that covers all the four sides and the top of the car (with the front face as a flap which can be rolled up). Assuming that the stitching margins are very small, and therefore negligible, how much tarpaulin would be required to make the shelter of height 2.5 metre with base dimension  $4m \times 3m$  ?



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**83.** An open box is made of wood 3 cm thick. Its external length, breadth and height are 1.48m, 1.16m and 8.3 dm. Find the cost of painting the inner surface of Rs. 50 per sq. metre.



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**84.** The cost of preparing the walls of room 12m long at the rate of Rs. 1.35 per square metre is RS. 340.20 and the cost of matting the floor at 85 paise per square metre is Rs. 91.80. Find the height of the room.



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**85.** The dimensions of a room are 12.5 m by 9m by 7m. There are 2 doors and 4 windows in the room; each door measures 2.5 m by 1.2 m and each window 1.5m by 1 m. Find the cost of painting the walls at Rs. 3.50 per square metre.



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**86.** The length and breadth of a hall are in the ratio 4:3 and its height is 5.5metres. The cost of decorating its walls (including doors and

windows) at  $Rs.6.60$  per square metre is  $Rs.5082$ .

Find the length and breadth of the room.



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**87.** A wooden bookshelf has external dimensions as follows: Height = 10 cm, Depth = 25cm, Breadth = 85 cm (See in Figure). The thickness of the plank is 5 cm everywhere. The external faces are to be polished and the inner faces are to be painted. If the rate of polishing is 20 paise per  $cm^2$  and the rate of painting is 10 paise per  $cm^2$ . Find the total

expenses required for polishing and painting the surface of the bookshelf.



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**88.** The paint in a certain container is sufficient to paint on area equal to  $9.375 \text{ m}^2$ . How many bricks of dimension  $22.5 \text{ cm} \times 10 \text{ cm} \times 7.5 \text{ cm}$  can be painted out of this container?



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**89.** A match box measure  $4\text{ cm} \times 2.5\text{ cm} \times 1.5\text{ cm}$ . What will be the volume of a packet containing 12 such boxes?



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**90.** The volume of a cuboid is  $440\text{ cm}^3$  and the area of its base is  $88\text{ cm}^2$ . Find the height.



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**91.** The capacity of a cuboidal tank is 50, 000 *litres* . Find the breadth of the tank if its length and depth are respectively 2. 5*m and 10m.*

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**92.** The volume of a cube is 1, 000  $cm^3$ . Find its total surface area.

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**93.** How many *3 metre cubes* can be cut from a cuboid measuring  $18m \times 12m \times 9m$  ?



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**94.** A cub of  $9\text{ cm}$  edge is immersed completely in a rectangular vessel containing water. If the dimensions of the base are  $15\text{ cm}$  and  $12\text{ cm}$ . Find the rise in water level in the vessel.



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95. The length of a cold storage is double its breadth. Its height is  $3\text{ metres}$ . The area of its four walls (including doors) is  $108\text{ m}^2$ . Find its volume.



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



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**97.** In Figure, the shape of a solid copper piece (made of two pieces with dimensions as shown in the figure) is shown. The face  $ABCDEF$  is the uniform cross-section. Assume that the angles at  $A$ ,  $B$ ,  $C$ ,  $D$  and  $F$  are right angles. Calculate the volume of the piece.



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**98.** A reservoir is in the form of a rectangular parallelepiped (cuboid). Its length is  $20\text{ m}$ . If  $18\text{ kl}$  of water is removed from the reservoir, the water

level goes down by  $15\text{cm}$ . Find the width of the reservoir ( $1\text{kl} = 1\text{m}^3$ )



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**99.** A granary is in the shape of a cuboid of size  $8\text{m} \times 6\text{m} \times 3\text{m}$ . If a bag of grain occupies a space of  $0.65\text{m}^3$ , how many bags can be stored in the granary?



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**100.** A solid cube is cut into two cuboids of equal volumes. Find the ratio of the total surface area of the given cube and that of one of the cuboids.



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**101.** The outer dimensions of a closed wooden box are  $10\text{cm}$  by  $8\text{cm}$  by  $7\text{cm}$ . Thickness of the wood is  $1\text{cm}$ . Find the total cost of wood required to make box if  $1\text{ cm}^3$  of wood costs  $Rs\ 2.00$



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**102.** A solid cube of side  $12\text{cm}$  is cut into 8 cubes of equal volume. What will be the side of the new cube? Also, find the ratio between their surface areas.



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**103.** A plot of land in the form of a rectangle has a dimension  $240\text{m} \times 180\text{m}$ . A drainlet  $10\text{m}$  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  $25\text{cm}$ . Find the depth of the drainlet.



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**104.** A metallic sheet is of the rectangular shape with dimensions  $48\text{cm} \times 36\text{cm}$ . From each one of its corners, a square of  $8\text{cm}$  is cut off. An open box is made of the remaining sheet. Find the volume of the box.



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**105.** How many planks each of which is  $2\text{m}$  long,  $2.5\text{cm}$  broad and  $4\text{cm}$  thick can be cut-off from a

wooden block  $6m$  long,  $15\text{ cm}$  broad and  $40\text{cm}$  thick?



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**106.** An agricultural field is in the form of a rectangle of length  $20m$  and width  $14\text{ m}$ . A pit  $6m$  long,  $3m$  wide and  $2.5m$  deep is dug in a corner of the field and the earth taken out of the pit is spread uniformly over the remaining area of the field. Find the extent to which the level of the field has been raised.



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**107.** A teak wood log is cut first in the form of a cuboid of length  $2.5m$ , *width*  $0.75m$  and of a certain thickness. Its volume is  $1.104m^3$ . How many rectangular planks of size  $2.3m \times 0.75m \times 0.04m$  can be cut from the cuboid?



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



irrigate in 30min, if  $9\text{ cm}$  of standing water is desired?



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



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**110.** A rectangular tank measuring  $5m \times 4.5m \times 2.1m$  is dug in the centre of the field measuring  $13.5m \times 2.5m$ . The earth dug out is spread evenly over the remaining portion of the field. How much is the level of the field raised?



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**111.** A rectangular water reservoir is  $10.8m$  by  $3.75m$  at the base. Water flows into it at the rate of  $18m$  per second through a pipe having the cross section  $7.5cm \times 4.5cm$ . Find the height

to which the water will rise in the reservoir in  $30m \in \text{utes}$ .



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**112.** Water flows in a tank  $150m \times 100m$  at the base, through a pipe whose cross-section is  $2dm$  by  $1.5dm$  at the speed of  $15 \text{ km per hour}$ . In what time, will the water be  $3 \text{ metres deep}$ ?



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**113.** A rectangular tank is  $225m$  by  $162m$  at the base. With what speed must water flow into it through an aperture  $60cm$  by  $45cm$  that the level may be raised  $20cm$  in  $5$  hours?



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**114.** The external length, breadth and height of a closed rectangular wooden box are  $18cm$ ,  $10cm$  and  $6cm$  respectively and thickness of wood is  $\frac{1}{2}cm$ . When the box is empty, it weighs  $15kg$  and when filled with sand it weighs  $100kg$ . Find the

weight of one cubic cm of weed and cubic cm of sand.



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**115.** A cuboidal water tank is 6m long, 5m wide and 4.5m deep. How many litres of water can it hold?



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**116.** A cubical vessel is 10m long and 8m wide. How high must it be made to hold 380 cubic metres of a liquid?



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**117.** Find the cost of digging a cuboidal pit 8m long, 6m broad and 3m deep at the rate of *Rs.30 per m<sup>3</sup>*



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**118.** If  $V$  is the volume of a cuboid of dimensions  $a$ ,  $b$ ,  $c$  and  $S$  is its surface area, then prove that

$$\frac{1}{V} = \frac{2}{S} \left( \frac{1}{a} + \frac{1}{b} + \frac{1}{c} \right)$$



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**119.** The areas of three adjacent faces of a cuboid are  $x$ ,  $y$  and  $z$ . If the volume is  $V$ , prove that  $V^2 = xyz$ .



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**120.** If the areas of three adjacent faces of a cuboid are  $8\text{ cm}^2$ ,  $18\text{ cm}^2$  and  $25\text{ cm}^2$ . Find the volume of the cuboid.



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**121.** The breadth of a room is twice its height, one half of its length and the volume of the room is  $512 \text{ cu m}$  Find the dimensions.



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**122.** A river 3 m deep and 40 m wide is flowing at the rate of 2 km per hour. How much water will fall into the sea in a minute?



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**123.** Water in a canal,  $30\text{dm}$  wide and  $12\text{dm}$  deep, is flowing with a velocity of  $20\text{km}$  per hour. How much area will it irrigate in  $30\text{ min}$ , if  $9\text{cm}$  of standing water is desired?



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**124.** Three metal cubes with edges  $6\text{cm}$ ,  $8\text{cm}$  and  $10\text{cm}$  respectively are melted together and formed into a single cube. Find the volume, surface area and diagonal of the new cube.



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**125.** Half cubic metre of gold-sheet is extended by hammering so as to cover an area of 1 hectare. Find the thickness of the gold-sheet.



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**126.** A metal cube of edge 12cm is melted and formed into three smaller cubes. If the edges of the two smaller cubes are 6cm and 8cm, find the edge of the third smaller cube.



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**127.** The dimensions of a cinema hall are 100m, 50m and 18m. How many persons can sit in the hall, if each person requires  $150m^3$  of air?



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**128.** Given that 1 cubic cm of marble weighs 0.25 kg, the weight of marble block 28cm in width and 5cm thick is 112kg. Find the length of the block.



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**129.** A box with lid is made of 2cm thick wood. Its external length, breadth and height are 25cm, 18cm and 15cm respectively. How many cubic cm of a liquid can be placed in it? Also, find the volume of the wood used in it.



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**130.** The external dimensions of a closed wooden box are 48cm, 36cm, 30cm. The box is made of 1.5cm thick wood. How many bricks of size  $6\text{cm} \times 3\text{cm} \times 0.75\text{cm}$  can be put in this box?



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**131.** How many cubic centimetres of iron are there in an open box whose external dimensions are 36cm, 25cm and 16.5cm, the iron being 1.5cm thick throughout? If 1 cubic cm of iron weighs 15g, find the weight of the empty box in kg.



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**132.** A cub of 9 *cm* edge is immersed completely in a rectangular vessel containing water. If the

dimensions of the base are  $15\text{cm}$  and  $12\text{cm}$ . Find the rise in water level in the vessel.



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**133.** A rectangular container, whose base is a square of side  $5\text{cm}$ , stands on a horizontal table, and holds water upto  $1\text{cm}$  from the top. When a cube is placed in the water it is completely submerged, the water rises to the top and  $2$  cubic  $\text{cm}$  of water overflows. Calculate the volume of the cube and also the length of its edge.



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**134.** A field is 200m long and 150m broad. There is a plot, 50m long and 40m broad, near the field. The plot is dug 7m deep and the earth taken out is spread evenly on the field. By how many metres is the level of the field raised? Give the answer to the second place of decimal.



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**135.** A field is in the form of a rectangle of length 18m and width 15m. A pit, 7.5m long, 6m broad and 0.8m deep, is dug in a corner of the field and the

earth taken out is spread over the remaining area of the field. Find cut the extent to which the level of the field has been raised.



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**136.** A rectangular tank is 80m long and 25m broad. Water flows into it through a pipe whose cross-section is  $25\text{cm}^2$ , at the rate of 16km per hour. How much the level of the water rises in the tank in 45 minutes.



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**137.** Water in a rectangular reservoir having base 80m by 60m is 6.5m deep. In what time can the water be emptied by a pipe of which the cross-section is a square of side 20cm, if the water runs through the pipe at the rate of 15km/hr.



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**138.** A village, having a population of 4000, requires 150 litres of water per head per day. It has a tank measuring  $20m \times 15m \times 6m$ . For how many days will the water of this tank last?



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**139.** A child playing with building blocks, which are of the shape of cubes, has built a structure as shown in Fig. 13.25. If the edge of each cube is 3 cm, find the volume of the structure built by the child.



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**140.** A godown measures  $40m \times 25m \times 10m$  .

Find the maximum number of wooden crates each

measuring  $1.5m \times 1.25m \times 0.5m$  that can be stored in the godown.



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**141.** A wall of length 10 m was to be built across an open ground. The height of 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  $24\text{ cm} \times 12\text{ cm} \times 8\text{ cm}$ , how many bricks would be required?



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**142.** If two cubes each of side 6cm are joined face to face, then find the volume of the resulting cuboid.



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**143.** Three cubes of metal whose edges are in the ratio 3:4:5 are melted down into a single cube whose diagonal is  $12\sqrt{3} \text{ cm}$  . Find the edges of three cubes.



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**144.** Find the edge of a cube whose surface area is  $432\text{ m}^2$



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**145.** A cuboid has total surface area of  $372\text{ cm}^2$  and its lateral surface area is  $180\text{ cm}^2$ , find the area of its base.



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**146.** Three cubes of each side  $4\text{ cm}$  are joined end to end. Find the surface area of the resulting

cuboid.



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**147.** The surface area of a cuboid is  $1300 \text{ cm}^2$ . If its breadth is  $10 \text{ cm}$  and height is  $20 \text{ cm}$ , find its length.



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**148.** If  $A_1$ ,  $A_2$  and  $A_3$  denote the areas of three adjacent faces of a cuboid, then its volume is

(a)  $A_1 A_2 A_3$  (b)  $2A_1 A_2 A_3$  (c)  $\sqrt{A_1 A_2 A_3}$  (d)

$A_1 A_2 A_3$



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**149.** The length of the longest rod that can be fitted in a cubical vessel of edge  $10\text{cm}$  long, is (a)  $10\text{ cm}$  (b)  $10\sqrt{2}\text{ cm}$  (c)  $10\sqrt{3}\text{ cm}$  (d)  $20\text{ cm}$



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**150.** If  $l$  is the length of a diagonal of a cube of volume  $V$ , then (a)  $3V = l^3$  (b)  $\sqrt{3}V = l^3$  (c)

$$3\sqrt{3} V = 2l^3 \quad \text{(d) } 3\sqrt{3} V = l^3$$



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**151.** Three equal cubes are placed adjacently in a row. The ratio of the total surface area of the resulting cuboid to that of the sum of the surface areas of three cubes, is (a) 7:9      (b) 49:81  
(c) 9:7      (d) 27:23



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**152.** If  $V$  is the volume of a cuboid of dimensions

$x, y, z$  and  $A$  is its surface area, then  $\frac{A}{V}$  (a)

$x^2y^2z^2$  (b)  $\frac{1}{2} \left( \frac{1}{xy} + \frac{1}{yz} + \frac{1}{zx} \right)$  (c)

$\frac{1}{2} \left( \frac{1}{x} + \frac{1}{y} + \frac{1}{z} \right)$  (d)  $\frac{1}{xyz}$



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**153.** The sum of the length, breadth and depth of a

cuboid is 19cm and its diagonal is  $5\sqrt{5}$  cm. Its

surface area is: (a)  $361 \text{ cm}^2$  (b)  $124 \text{ cm}^2$  (c)

$236 \text{ cm}^2$  (d)  $486 \text{ cm}^2$



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**154.** If the length of a diagonal of a cube is  $8\sqrt{3} \text{ cm}$ , then its surface area is (a)  $512 \text{ cm}^2$  (b)  $384 \text{ cm}^2$  (c)  $192 \text{ cm}^2$  (d)  $768 \text{ cm}^2$



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**155.** 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%



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**156.** If the volumes of two cubes are in the ratio 8:1, then the ratio of their edges is (a) 8:1 (b)  $2\sqrt{3}:1$  (c) 2:1 (d) none of these



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**157.** The volume of a cube whose surface area is  $96 \text{ cm}^2$ , is (a)  $16\sqrt{2} \text{ cm}^3$  (b)  $32 \text{ cm}^3$  (c)  $64 \text{ cm}^3$  (d)  $216 \text{ cm}^3$



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**158.** The length, width and height of a rectangular solid are in the ratio of 3:2:1. If the volume of the box is  $48 \text{ cm}^3$ , the total surface area of the box is:  
(a)  $27 \text{ cm}^2$  (b)  $32 \text{ cm}^2$  (c)  $44 \text{ cm}^2$  (d)  $88 \text{ cm}^2$



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**159.** A cube whose volume is  $\frac{1}{8}$  cubic centimetre is placed on top of a cube whose volume is  $1 \text{ cm}^3$ . The two cubes are then placed on top of a third cube whose volume is  $8 \text{ cm}^3$ . The height of the

stacked cubes is (a) 3.5 cm (b) 3 cm (c) 7 cm (d)  
none of them



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**160.** If the areas of the adjacent faces of a rectangular block are in the ratio 2:3:4 and its volume is  $9000 \text{ cm}^3$ , then the length of the shortest edge is (a) 30 cm (b) 20 cm (c) 15 cm (d) 10 cm



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**161.** If each edge of a cube, of volume  $V$ , is doubled, then the volume of the new cube is (a)  $2V$  (b)  $4V$  (c)  $6V$  (d)  $8V$



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**162.** If each edge of a cuboid of surface area  $S$  is doubled, then surface area of the new cuboid is (a)  $2S$  (b)  $4S$  (c)  $6S$  (d)  $8S$



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**163.** The area of the floor of a room is  $15 \text{ m}^2$ . If its height is 4 m, then the volume of the air contained in the room is (a)  $60 \text{ dm}^3$  (b)  $600 \text{ dm}^3$   $6000 \text{ dm}^3$  (d)  $60000 \text{ dm}^3$



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**164.** The cost of constructing a wall 8 m long, 4 m high and 20 cm thick at the rate of  $50 \text{ Rs per m}^3$  is Rs. 16 (b) Rs. 80 (c) Rs. 160 (d) Rs. 320



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**165.** 10 cubic metres clay is uniformly spread on a land of area 10 ares. The rise in the level of the ground is (a) 1 cm (b) 10 cm (c) 100 cm (d) 1000 cm



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**166.** Volume of a cuboid is  $12 \text{ cm}^3$ . The volume ( $\text{cm}^3$ ) of a cuboid whose sides are double of the above cuboid is: (a) 24 (b) 48 (c) 72 (d) 96



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**167.** If the sum of all the edges of a cube is 36 cm, then the volume (in  $cm^3$ ) of that cube is (a) 9 (b) 27 (c) 219 (d) 729



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**168.** The number of cubes of side 3 cm that can be cut from a cuboid of dimensions  $10cm \times 9cm \times 6cm$ , is (a) 9 (b) 10 (c) 18 (d) 20



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