CBSE TEST PAPER-01

CLASS - IX Mathematics (Surface area and volume)

General Instruction: All questions are compulsory. Question No. 1 to 4 carry one mark each. No. 5 to 8 carry two marks each. Question No. 9 to 12 carry 3 marks each. Question number 13 carry 5 marks.

1.If the perimeter of one of the faces of a cube is 40 cm, them its volume is
(a)6000 cu cm (b)1600 cu cm (c) 1000 cu cm (d) 600 cu cm

2.A cuboid having surface areas of 3 adjacent faces as a,b and c has the volume
(a) $3\sqrt{abc}$ (b) $\sqrt{abc}$ (c) abc (d) a^3 b^3 c^3

3.The diameter of a right circular cylinder is 21 cm and its height is 8 cm. The Volume of the cylinder is
(a) 528 cu cm (b)1056 cu cm (c)1386 cu cm (d) 2772 cu cm

4.Each edge of a cube is increased by 40%. The % increase in the surface area is.
(a) 40 (b) 96 (c) 160 (d) 240

5.Curved surface area of a right circular cylinder is 4.4 sq m. if the radius of the base of the cylinder is 0.7 m find its height.

6.The circumference of the trunk of a tree (cylindrical), is 44dm. Find the volume of the timber obtained from the trunk if the length of the trunk is 5 m. ($\pi = \frac{22}{7}$).

7.If the areas of three adjacent faces of a cuboids are X, Y and Z. If its volume is V, prove that $V^2 = XYZ$

8.Find the volume of an iron bar has in the shape of cuboids whose length, breadth and height measure 25 cm. 18 cm and 6 cm respectively. Find also its weight in kilograms if 1 cu cm of iron weight 100 grams.

9.The surface area of cuboids is 3328 m^2; its dimensions are in the ratio 4:3:2. Find the

volume of the cuboid.

10.The volume of a rectangular slower of stone is 10368 dm^3 and is dimensions are in the ratio of 3:2:1. (i) Find the dimensions (ii) Find the cost of polishing its entire surface @ Rs. 2 per dm^2.

11.In a cylindrical drum of radius 4.2 m and height 3.5 m, how many full bags of wheat can be emptied if the space required for each bag is 2.1 cu m.

12.The inner diameter of a cylindrical wooden tripe is 24 cm. and its outer diameter is 28 cm. the length of wooden tripe is 35 cm. find the mass of the tripe, if 1 cu cm of wood has a mass of 0.6 g.

13. The difference between outside and inside surface of a cylindrical metallic tripe 14 cm. long is 44 sq cm. if the tripe is made of 99 cu cm. of metal, find the outer and inner radius of the tripe.

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[ANSWERS]

Ans01. (c)1000 cu cm

Ans02. (b) $\sqrt{abc}$

Ans03. (d) 2772 cu cm

Ans04. (b) 96

Ans05 Curved surface area of the cylinder = 4.4sq.m

Radius of the cylinder = 0.7m

Let h be the height of the cylinder

$\therefore$ Curved surface area of the cylinder = $2\pi rh$

$2\pi rh$=4.4

or,

$$2\times\frac{22}{7}\times 0.7\times h = 4.4$$

$$h = \frac{4.4\times 7}{2\times 22\times 0.7}m$$

$$= \frac{44\times 7}{44\times 7}m$$

$$= 1m$$

Hence the height of the cylinder = 1m

Ans06. Let r be the radius of the cylindrical Trunk

Circumference of the trunk = 44dm

$\therefore$ $2\pi r = 44$

$$2\times\frac{22}{7}\times r = 44$$

$\therefore r = 7dm \Rightarrow \frac{7}{10}m$

$\therefore$ Volume of the timber = $\pi r^2 h\ cm\ unit$

$= \left(\frac{22}{7} \times \frac{7}{10} \times \frac{7}{10} \times 5\right) cu\ m$

$= \frac{770}{100} cu\ m$

$= 7.7 cu\ m$

Ans07. Let length, breadth and height of the cuboid l, b and h respectively

$\therefore$ v = lbh (i)

Again,

x = lb

y = bh

and z = hl

$\therefore$ xyz = (lb) (bh) (hl)

= $l^2 b^2 h^2$

$= (lbh)^2$

$= v^2$ [using(i)]

Hence, $v^2 = xyz$

Ans08. Length of the bar,l = 25cm

Breadth of the bar,b = 18cm

Height of the bar ,h= 6cm

$\therefore$ Volume of the iron bar = $l \times b \times h\ cu\ unit$

= $(25 \times 18 \times 6) cu\ cm$

= $2700 cu\ cm$

Weight of the bar = $(2700 \times 100) gm$

= 270000gm

$= \frac{270000}{1000} kg$

= 270kg

Ans09.Let the dimensions of the cuboid be 4x, 3x and2x meters

Surface area of the cuboid =2(lb+bh+hl)= $2\left(4x\times3x+3x\times2x+2x\times4x\right)sq\ m$

= $2\left(12x^2+6x^2+8x^2\right)sq\ m$

= $52x^2sq\ m\rightarrow(i)$

Given surface area = 3328sq m ---->*(ii)*

From (i) and (ii) we get

$52x^2=3328$

$or\ \ x^2=\frac{3328}{52}=64$

$x=\sqrt{64}$

$orx=8$

length ,breadth and height are

$\therefore 4x=32,\ 3x=24\ and\ \ 2x=16$

Thus the dimensions of the cuboid are 32m, 24m and 16m

$\therefore Volume\ of\ the\ cuboid=\left(32\times24\times16\right)m^3$

= 12288cu m

Ans10. Let the length of the block be 3x dm

Width =2x dm and height = x dm

Volume of the block = 10368 dm^3

$\therefore 3x\times2x\times x=10368$

or $x^3=\frac{10368}{6}$

$=1728$

$\therefore x=\sqrt[3]{1728}$

$=\sqrt[3]{12\times12\times12}$

$=12$

also 2x = 24 and 3x = 36

Thus dimensions of the block are 36dm, 24dm and 12dm

Surface area of the block = $2\left(36\times24+24\times12+36\times12\right)dm^2$

= 2(864+288+432) dm^2

$= 2 \times 1584 dm^2$

$= 3168 dm^2$

Cost of polishing the surface = $Rs(2 \times 3168)$

= Rs6336

Ans11.Radius of the drum = 4.2m = $\frac{42}{10} m$

Height of the drum =3.5m = $\frac{35}{10} m$

$\therefore$ Volume of the drum $= \pi r^2 h cu\ units$

$= \left(\frac{22}{7} \times \frac{42}{10} \times \frac{42}{10} \times \frac{35}{10} \right) cu\ m \quad \rightarrow$ (i)

Volume of wheat in each bags $= 2.1 cu\ m = \frac{21}{10} cu\ m \quad \rightarrow$ (ii)

$\therefore$ Number of bags= $\frac{\text{volume of drum}}{\text{volume of wheat in each bag}}$

$= \frac{\frac{22}{7} \times \frac{42}{10} \times \frac{42}{10} \times \frac{35}{10}}{\frac{21}{10}} \quad [from\ (i)\ and\ (ii)]$

$= \frac{924}{10} = 92.4$

$= 92$

Hence the number of full bags is 92

Ans12. Inside diameter of the pipe = 24cm

Outside diameter of the pipe = 28cm

Length of the pipe = 35cm = (h say)

Outside radius of the pipe = $\frac{28}{2} cm = 14cm = R(says)$

Inside redius of the pipe,r = $\frac{24}{2} cm = 12cm$

Volume of the wood = External volume – Internal volume

$= \pi R^2 h - \pi r^2 h$

$= \pi h(R^2 - r^2) = \pi \times 35\left(14^2 - 12^2\right) cu\ cm$

$= \frac{22}{7} \times 35(14+12)(14-12) cu\ cm$

$= 5720 cu\ cm$

Mass of 1cu cm = 0.6g

∴ Mass of the pipe = $(0.6 \times 5720)\, g$

= 3432g

= $\frac{3432}{1000} kg$

= 3.432kg

Ans13. Let $r_1$cm and $r_2$cm can be the inner and outer radii respectively of the pipe

Area of the outside surface = $2\pi r_2 h\ sq\ unit$

Area of the inside surface = $2\pi r_1 h\ sq\ unit$

∴ By the given condition

$2\pi r_2 h - 2\pi r_1 h = 44$

or $2\pi h(r_2 - r_1) = 44$

$\therefore 2 \times \frac{22}{7} \times 14 \times (r_2 - r_1) = 44 \left(\because h = 14cm\right)$

or $88(r_2 - r_1) = 44$

$\therefore (r_2 - r_1) = \frac{1}{2} \quad (i)$

Again volume of the metal used in the pipe $= \pi\left(r_2^2 - r_1^2\right) hcu\ units$

$\therefore \frac{22}{7}\left(r_2^2 - r_1^2\right) \times 14 = 99$ (given)

or $44\left(r_2^2 - r_1^2\right) = \frac{99}{44} = \frac{9}{4}$ (ii)

Dividing (ii) by (i) we get,

$\frac{\left(r_2^2 - r_1^2\right)}{r_2 - r_1} = \frac{9}{4} \div \frac{1}{2}$

or $r\dfrac{(r_2-r_1)(r_2+r_1)}{(r_2-r_1)}=\dfrac{9}{4}\times\dfrac{2}{1}$

$\therefore (r_2+r_1)=\dfrac{9}{2}$

Also, $(r_2-r_1)=\dfrac{1}{2}$ [from(i)]

$2r_2=5$

$\therefore r_2=\dfrac{5}{2}$

and, $\dfrac{5}{2}+r_1=\dfrac{9}{2}$

$\therefore r_1=\dfrac{9}{2}-\dfrac{5}{2}$

$or\ r_1=2$

Thus outer radius $=2.5\ cm$

Thus outer radius and inner radius=2.5cm