SHIKSHA CLASSES

Sub. : Maths **Answer Paper** **Marks : 20**

Std. : VIIIth - S.B. **16. Surface area and Volume**

Q.1 : **A) Select the most appropriate Alternative.** 02

1) If l = length, b = breadth, h = height, then total surface area of cuboid is.

Ans : d) $2(lb + bh + hl)$

2) The height of cylinder is 21 cm and the radius of its base is 5 cm, then its curved surface area is _____.

Ans : a) 660 sq cm

: B) Solve the following. 01

1) Find total surface area of cube of side 6 cm.

Ans : Two side of cube = 6 cm

Total surface area of cube = 6 (Side)^2

$= 6 \times (6)^2$

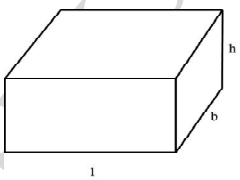
$= 6 \times 6 \times 6$

$= 216$ cm^2

Q.2 : **A) Solve any one of the following. (Activity)** 02

1) Find how many litre of water will a cuboidal fish tank contain if its length, breadth and height are 1 m, 40 cm and 50 cm respectively.

Ans : The water contained in the tank is equal to volume of the tank.



Length of tank = 1m = 100cm, breadth = 40 cm, height = 50cm.

$\therefore$ Volume of the tank = $l \times b \times h$

$= 100 \times \boxed{40} \times \boxed{50} = 200000$cc,

Volume of water in the tank = 200000 cc

$= \dfrac{200000}{\boxed{1000}} = 200$ litre

($\because \boxed{1000}$ cc = 1l)

$\therefore$ Tank will contain 200 litre of water

2) Height of a cylindrical drum is 56 cm. Find the radius of the drum if the capacity of that drum is 70.4 litre.

$\left(\pi = \dfrac{22}{7}\right)$

Ans : Let the radius of ylindrical drum be = r

capacity of drum = volume of drum = 70.4 $\times$ 1000 cc

1 litre = 1000 ml

$\therefore$ 70.4 litre = 70400 ml

$\therefore$ volume of water = $\pi r^2 h = 70400$

$\therefore \ r^2 = \dfrac{70400}{\pi h} = \dfrac{70400 \times 7}{\boxed{22} \times \boxed{56}}$

$= \dfrac{70400}{22 \times \boxed{8}} = \dfrac{\boxed{8800}}{22} = 400$

$\therefore$ r = 20, $\therefore$ radius of the drum is 20cm.

: B) Solve any one of the following. 02

1) A cuboid shaped soap bar has volume 150 cc. Find its thickness if its length is 10 cm and breadth is 5 cm.

Ans : Volume of cuboid shaped soap bar = 150 cc.

it length (l) = 10 cm

its breadth (b) = 5 cm

Volume of the cuboid shaped soap bar = $l \times b \times h$

$\therefore 150 = 10 \times 5 \times h$

$\therefore h = \frac{150}{10 \times 5} = 3$ cm

Thickness of the soap bar is 3 cm.

2) Find the volume of the cylinder if height (h) and radius of the base (r) are as given below.

r =10.5 cm, h = 8 cm.

Ans : The radius of the base of the cylinder (r) = 10.5 cm its height (h) = 8 cm

Volume of the cylinder = $\pi r^2 h$

$= \frac{22}{7} \times 10.5 \times 10.5 \times 8$

$= 22 \times 1.5 \times 10.5 \times 8 = 2772$ cm^3

$\therefore$ Volume of the cylinder is 2772 cm^3

Q.3 : A) Solve any one of the following. (Activity) 03

1) If 5 litre molten mixture of khoa and sugar is poured in a tray it fills to its full capacity. Find the length of the tray if its breadth is 40 cm and height is 2.5 cm.

To solve the example fill the empty boxes with suitable numbers.

Step i) : Capacity of tray = 5 litre = $\boxed{5000}$ cc ($\because$ 1 litre = 1000 cc)

Step ii) : Volume of mixture = $\boxed{5000}$ cc

Step iii) Volume of rectangular tray = volume of mixture $l \times b \times h = \boxed{5000}$ cc

length $\times$ 40 $\times$ 2.5 = $\boxed{5000}$ cc,

$\therefore$ length = $\frac{\boxed{5000}}{100} = 50$ cm

2) Leonard Euler, a great mathematician, at a very young age discovered an interesting formula regarding the faces, vertices and edges of solid figures. Count and write the faces, vertices and edges of the following figures and complete the table. From the table verify Euler's formula, F + V = E + 2.

Name	Cube	Cuboid	Triangular Prism	Triangular pyramid	Pentagonal pyramid	Hexagonal prism
Shapes						
Faces (F)	6					8
Vertices (V)	8					12
Edges (E)		12			10	

Ans :

Name	Cube	Cuboid	Triangular Prism	Triangular pyramid	Pentagonal pyramid	Hexagonal prism
Shapes						
Faces (F)	6	6	5	4	6	8
Vertices (V)	8	8	6	4	6	12
Edges (E)	12	12	9	6	10	18

Considering example :

L.H.S = F + V

= 6 + 8 = 14

R.H.S. = E + 2

= 12 + 2 = 14

$\therefore$ L.H.S = R.H.S,

$\therefore$ F + V = E + 2.

Thus, Euler's formula can be verified in each case in the same manner.

: B) Solve any one of the following. 03

1) Find the volume of the cylinder if the circumference of the cylinder is 132 cm and height is 25 cm.

Ans : Circumference of the base of the cylinder = 132 cm its height (h) = 25 cm

Circumference of the base of the cylinder = $2\pi r$

$\therefore 132 = 2 \times \frac{22}{7} \times r$

$\therefore r = \frac{132 \times 7}{2 \times 22}$

$\therefore r = 3 \times 7$

$\therefore r = 21$ cm

Volume of the cylinder $= \pi r^2 h$

$= \frac{22}{7} \times 21 \times 21 \times 25$

$= 22 \times 3 \times 21 \times 25 = 34650$ cu cm

$\therefore$ Volume of the cylinder is 34650 cu cm.

2) How many bricks of length 25 cm, breadth 15 cm and height 10 cm are required to build a wall of length 6 m, height 2.5 m and breadth 0.5 m?

Ans : For brick,

length (l) = 25 cm, breadth (b) = 15 cm and height (h) = 10 cm

For the wall,

length (l_1) = 6 m = 600 cm

height (h_1) = 2.5 m = 250 cm

breadth (b_1) = 0.5 m = 50 cm

Number of bricks required to build the wall

$= \frac{\text{Volume of the wall}}{\text{Volume of the brick}}$

$= \frac{l_1 \times b_1 \times h_1}{l \times b \times h}$

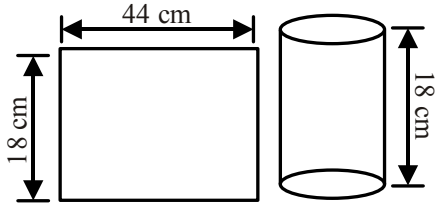
$= \frac{600 \times 250 \times 50}{25 \times 15 \times 10} = 2000$

$\therefore$ The number of bricks required to build the wall is 2000 bricks.

Q.4 : Solve any one of the following. 04

1) A rectangular sheet of paper 44 cm × 18 cm is rolled along its length and a cylinder is formed. Find the volume of the cylinder. $\left(\pi = \frac{22}{7}\right)$

Ans :



When the recatangular sheet is roled along its length, we find that the length of the sheet froms the circumference of its base and breadth of the sheet becomes the height of the cylinder.

Let r cm be the radius of the base and h cm be the height.

Then h = 18 cm

Circumference of the base = length of the sheet

$\therefore$ Circumference = 44 cm

$\therefore 2\ \pi r = 44$

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

$\therefore r = 7$ cm

Volume of the cylinder $= \pi r^2 h$ cm^3

$= \frac{22}{7} \times 7^2 \times 18$ cm^3

$= 2772$ cm^3.

2) Find the area of the sheet required to make a cylindrical container, which is open at one side and whose diameter is 28 cm and height 20 cm. Find the approximate area of the sheet required to make a lid of height 2 cm for this container.

Ans : Diameter of the container = 28 cm

its radius (r) = 14 cm

its height (h) = 20 cm

Area of the sheet required to make the container

= Curved surface area of the container + Area of the base of the container

$= 2\pi rh + \pi r^2$

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

$= \frac{22}{7} \times 14(2 \times 20 + 14)$

$= 44 \times (40+14)$

$= 44 \times 54 = 2376$ sq cm

Let the height of cylindrical lid be h_1.

$\therefore h_1 = 2$ cm

Approximate area of sheet required to make a lid of height 2 cm $= 2\pi r h_1 + \pi r^2$

$= 2 \times \frac{22}{7} \times 14 \times 2 + \frac{22}{7} \times 14 \times 14$

$= 176 + 616$

$= 792$ sq cm

$\therefore$ Area of the sheet required to make the container is 2376 sq cm and approximate area of sheet required to make a lid is 792 sq cm.

Q.5 : Solve any one of the following. 03

1) The ratio between the curved surface area and the total surface area of a right circular cylinder is 1 : 2. Find the ratio between the height and radius of the cylinder.

Ans : Let h be the height and r be the radius of the cylinder. Then

$$\frac{2\pi rh}{2\pi rh + 2\pi r^2} = \frac{1}{2}$$

$$\text{or } \frac{2\pi rh}{2\pi r(h+r)} = \frac{1}{2}$$

$$\text{or } \frac{h}{h+r} = \frac{1}{2}$$

$\therefore 2h = h + r$

$\therefore h = r$

$$\therefore \frac{h}{r} = \frac{1}{1}$$

$\therefore h : r = 1 : 1$

$\therefore$ Hence, the required ratio is 1:1

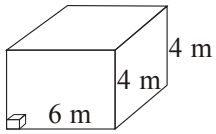
2) The length and height of a cuboidal warehouse is 6m, 4m and 4m respectively. How many cube shaped boxes of side 40 cm will fill the warehouse completely ?

Ans : When all the boxes are arranged to fill the warehouse completely the total volume of all boxes equals the volume of the warehouse. To solve the example we will consider the following steps.

i) Find volume of warehouse

ii) Find volume of a box.

iii) Find the number of boxes



Step (i) : Length of warehouse = 6 m = 600cm, breadth = height = 4 m = 400 cm

Volume of warehouse $= l \times b \times h$

$= 600 \times 400 \times 400$ cc

Step (ii) : Volume of a box $= l^3 = (40)^3$

$= 40 \times 40 \times 40$ cc

Step (iii) : Number of boxes

$$= \frac{\text{volume of warehouse}}{\text{volume of a box}}$$

$$= \frac{600 \times 400 \times 400}{40 \times 40 \times 40} = 1500$$

$\therefore$ 1500 boxes will fill the warehouse completely.

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