Surface Areas and Volume of a Cuboid and Cube Ex 18.2 Q10

Answer :

Let,

$a_1, a_2, a_3 \rightarrow$ Sides of the three small cubes

$v_1, v_2, v_3 \rightarrow$ Volumes of the three small cubes

$a \rightarrow$ Side of the new cube formed

$V \rightarrow$ Volume of the new cube formed

$S \rightarrow$ Surface area of the new cube formed

$D \rightarrow$ Diagonal of the new cube formed

We have,

$a_1 = 6\,\text{cm}$

$a_2 = 8\,\text{cm}$

$a_3 = 10\,\text{cm}$

We need to find the volume, surface area and diagonal of the new cube

Now,

$$v_1 = a_1^3$$
$$= 6^3$$
$$= 216\,\text{cm}^3$$
$$v_2 = a_2^3$$
$$= 8^3$$
$$= 512\,\text{cm}^3$$
$$v_3 = a_3^3$$
$$= 10^3$$
$$= 1000\,\text{cm}^3$$

We know,

$$V = v_1 + v_2 + v_3$$
$$a^3 = 216 + 512 + 1000 \qquad \{\text{Since, } V = a^3\}$$
$$= 1728\,\text{cm}^3$$
$$a = 12\,\text{cm}$$
$$S = 6a^2$$
$$= 6(12^2)$$
$$= 6 \times 144$$
$$= 864\,\text{cm}^2$$
$$D = \sqrt{3}\,a$$
$$= 12\sqrt{3}\,\text{cm}$$

So, the volume, surface area and the diagonal of the new cube will be $\boxed{1728\,\text{cm}^3,\ 864\,\text{cm}^2 \text{ and } 12\sqrt{3}\,\text{cm}}$ respectively.

Surface Areas and Volume of a Cuboid and Cube Ex 18.2 Q11

Answer :

We have volume of each cube $(V) = 512\,\text{cm}^3$

Let,

$a \rightarrow$ Side of each cube

The two cubes are joined together and we are asked to find the surface area of new cuboid

We know that,

$$V = a^3$$

$$512 = a^3$$

$$a = 8\,\text{cm}$$

When the two cubes are joined end to end,

Dimensions of the resulting cuboid are,

Length $(l) = 2a$

Breadth $(b) = a$

Height $(h) = a$

Hence, its surface area

$$= 2(lb + bh + hl)$$

$$= 2\left[(2a)a + a \times a + a(2a)\right]$$

$$= 10a^2$$

$$= 10 \times 8^2 \qquad \{\text{Since}, a = 8\,\text{cm}\}$$

$$= 640\,\text{cm}^2$$

The surface area of the resulting cuboid will be $\boxed{640\,\text{cm}^2}$.

********** END **********