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

Answer:

Let,

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

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

$a \to$ Side of the new cube formed

$V \to$ Volume of the new cube formed

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

$D \to$ 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,

$v_1 = a_1^3$

$\quad = 6^3$

$\quad = 216 \, \text{cm}^3$

$v_2 = a_2^3$

$\quad = 8^3$

$\quad = 512 \, \text{cm}^3$

$v_3 = a_3^3$

$\quad = 10^3$

$\quad = 1000 \, \text{cm}^3$

We know,

$V = v_1 + v_2 + v_3$

$a^3 = 216 + 512 + 1000 \qquad \{\text{Since, } V = a^3\}$

$\quad = 1728 \, \text{cm}^3$

$a = 12 \, \text{cm}$

$S = 6a^2$

$\quad = 6(12^2)$

$\quad = 6 \times 144$

$\quad = 864 \, \text{cm}^2$

$D = \sqrt{3} \, a$

$\quad = 12\sqrt{3} \, \text{cm}$

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 $\boxed{640\,\text{cm}^2}$.

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