

If the surface area of a cube is increasing at a rate of $3.6 \text{ cm}^2/\text{sec}$, retaining its shape; then the rate of change of its volume (in cm^3/sec .), when the length of a side of the cube is 10 cm , is :

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(a) 18

(b) 10

(c) 20

(d) 9

(d) Let the side of cube be a .

$$S = 6a^2 \Rightarrow \frac{dS}{dt} = 12a \cdot \frac{da}{dt} \Rightarrow 3.6 = 12a \cdot \frac{da}{dt}$$

$$\Rightarrow 12(10) \frac{da}{dt} = 3.6 \Rightarrow \frac{da}{dt} = 0.03$$

$$V = a^3 \Rightarrow \frac{dV}{dt} = 3a^2 \cdot \frac{da}{dt} = 3(10)^2 \cdot \left(\frac{3}{100}\right) = 9$$