The rate of change of the volume of a sphere w.r.t. its surface area, when the radius is 2 cm, is

a. 1 **b.** 2

c. 3 **d.** 4

a. $V = \frac{4}{3}\pi r^3, S = 4\pi r^2$

$$\frac{dV}{dr} = 4\pi r^2, \quad \frac{dS}{dr} = 8\pi r$$

$$\therefore \frac{dV}{dS} = \frac{dV/dr}{dS/dr} = \frac{4\pi r^2}{8\pi r} = \frac{r}{2}$$

When $r = 2$, $\frac{dV}{dS} = \frac{2}{2} = 1$