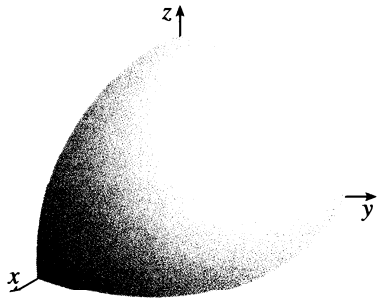
The positive octant of a sphere of radius a is the solid defined by the four inequalities $x \geq 0$, $y \geq 0$, $z \geq 0$ and $x^2 + y^2 + z^2 \leq a^2$, as shown.



Select the option that gives the volume of the octant of the sphere, using spherical polar coordinates.

Options

A $\int_0^a \int_0^{\pi/2} \int_0^{\pi/2} 1 \, d\theta \, d\phi \, dr$

B $\int_0^a \int_0^{\pi} \int_0^{\pi} 1 \, d\theta \, d\phi \, dr$

C $\int_0^a \int_0^{\pi/2} \int_0^{\pi/2} r \sin\theta \, d\theta \, d\phi \, dr$

D $\int_0^a \int_0^{\pi} \int_0^{\pi} r \sin\theta \, d\theta \, d\phi \, dr$

E $\int_0^a \int_0^{\pi/2} \int_0^{\pi/2} r^2 \sin\theta \, d\theta \, d\phi \, dr$

F $\int_0^a \int_0^{\pi} \int_0^{\pi} r^2 \sin\theta \, d\theta \, d\phi \, dr$

G $\int_0^a \int_0^{\pi/2} \int_0^{\pi/2} r^3 \sin\theta \, d\theta \, d\phi \, dr$

H $\int_0^a \int_0^{\pi} \int_0^{\pi} r^3 \sin\theta \, d\theta \, d\phi \, dr$