D.

$\iiint x^2 + y^2\, dV$

$dV = \rho\sin\phi\, d\rho\, d\phi\, d\Theta$

To turn into spherical coordinates,

$f(x,y,z)= x^2 + y^2 = (\rho\cos\Theta\sin\phi)^2 + (\rho\sin\Theta\sin\phi)^2$

$= (\rho\sin\phi)^2 (\cos^2\Theta + \sin^2\Theta) = (\rho\sin\phi)^2$

Since we are integrating the unit ball, $0 \le r \le 1$ and $r = \rho$

Also, we are integrating only where $x \ge 0$ so $-pi/2 \le \Theta \le pi/2$

Lastly, $0 \le \phi \le pi$

$\int_{\Theta = -pi/2}^{\Theta = -pi/2} \int_{\phi=0}^{\phi=pi} \int_{\rho=0}^{\rho=1} (\rho\sin\phi)^2 * \rho\sin\phi\, d\rho\, d\phi\, d\Theta$

$\int_{\rho=0}^{\rho=1} \rho^3\sin^3\phi\, d\rho = \rho^4/4 \sin^3\phi$ from 0 to 1 $= 1/4 \sin^3\phi$

$1/4 \int_{\phi=0}^{\phi=pi} \sin^3\phi\, d\phi = 1/4 \int_{\phi=0}^{\phi=pi} \sin\phi(\sin^2\phi)\, d\phi$

$=1/4 \int_{\phi=0}^{\phi=pi} \sin\phi(1-\cos^2\phi)\, d\phi$ let $u = \cos\phi$ $dx = du/-\sin\phi$

$=-1/4 \int_{\phi=0}^{\phi=pi} (1-u^2)du = -1/4(\cos\phi - \cos^3\phi/3)$ from 0 to pi

$= -1/4(-1+1/3) + ¼(1-1/3) = 1/3$

And then integrating the last integral, $= 1/3\ \Theta$ from –pi/2 to pi/2, the answer becomes pi/3