

Let S_1 be the lateral surface, S_2 the top disk, and S_3 the bottom disk.

On S_1 : $\mathbf{r}(\theta, z) = 3 \cos \theta \mathbf{i} + 3 \sin \theta \mathbf{j} + z \mathbf{k}$, $0 \leq \theta \leq 2\pi$, $0 \leq z \leq 2$,
 $|\mathbf{r}_\theta \times \mathbf{r}_z| = 3$,

$$\iint_{S_1} (x^2 + y^2 + z^2) dS = \int_0^{2\pi} \int_0^2 (9 + z^2) 3 dz d\theta = 2\pi(54 + 8) = 124\pi .$$

On S_2 : $\mathbf{r}(\theta, r) = r \cos \theta \mathbf{i} + r \sin \theta \mathbf{j} + 2 \mathbf{k}$, $0 \leq r \leq 3$, $0 \leq \theta \leq 2\pi$,
 $|\mathbf{r}_\theta \times \mathbf{r}_r| = r$,

$$\iint_{S_2} (x^2 + y^2 + z^2) dS = \int_0^{2\pi} \int_0^3 (r^2 + 4) r dr d\theta = 2\pi\left(\frac{81}{4} + 18\right) = \frac{153}{2}\pi .$$

On S_3 : $\mathbf{r}(\theta, r) = r \cos \theta \mathbf{i} + r \sin \theta \mathbf{j}$, $0 \leq r \leq 3$, $0 \leq \theta \leq 2\pi$, $|\mathbf{r}_\theta \times \mathbf{r}_r| = r$,

$$\iint_{S_3} (x^2 + y^2 + z^2) dS = \int_0^{2\pi} \int_0^3 (r^2 + 0) r dr d\theta = 2\pi\left(\frac{81}{4}\right) = \frac{81}{2}\pi .$$

Hence $\iint_S (x^2 + y^2 + z^2) dS = 124\pi + \frac{153}{2}\pi + \frac{81}{2}\pi = 241\pi$.