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$$a)\nabla.D = \rho_V = < \frac{\partial}{\partial x}, \frac{\partial}{\partial y}, \frac{\partial}{\partial z} > . < xy^2z^3, 0, 0 >= y^2z^3 \frac{C}{m}$$

$$b)Q = \int_V \rho_V dv = \int_0^2 \int_0^2 \int_0^2 y^2z^3 dxdydz = \frac{64}{3}C$$

$$c)\oint_S \vec{D}.d\vec{s} = Q$$

$$\oint_{left\ face} \vec{D}.d\vec{s} = \int \int xy^2z^3 \hat{x}.-\hat{y}dxdz = 0$$

$$\oint_{right\ face} \vec{D}.d\vec{s} = \int \int xy^2z^3 \hat{x}.\hat{y}dxdz = 0$$

$$\oint_{bottom\ face} \vec{D}.d\vec{s} = \int \int xy^2z^3 \hat{x}.-\hat{z}dxdz = 0$$

$$\oint_{top\ face} \vec{D}.d\vec{s} = \int \int xy^2z^3 \hat{x}.\hat{z}dxdz = 0$$

$$\oint_{front\ face} \vec{D}.d\vec{s} = \int_0^2 \int_0^2 xy^2z^3 \hat{x}.\hat{x}dxdz = \frac{64}{3}C$$

$$\oint_{back\ face} \vec{D}.d\vec{s} = \int_0^2 \int_0^2 xy^2z^3 \hat{x}.\widehat{-x}dxdz = 0$$