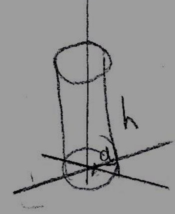
(37) a)



$E = \{(r,\theta,z) \mid r\in[0,a],\ z\in[0,h],\ \theta\in[0,2\pi]\}$

$k = \rho(x,y,z)$

$$I_z = k\int_0^{2\pi}\int_0^a\int_0^h (x^2+y^2)\,dV = k\int_0^{2\pi}\int_0^a\int_0^h r^3\,dz\,dr\,d\theta$$

$$I_z = k\int_0^{2\pi} d\theta \int_0^a r^3\,dr \int_0^h dz = 2\pi hk\left(\frac{a^4}{4}\right)$$

$$\boxed{I_z = \frac{\pi h k a^4}{2}}$$

b) $I_x = \iiint_E (\cancel{x}\,y^2+z^2)\,k r\,dz\,dr\,d\theta$

$$= \int_0^h\int_0^a\int_0^{2\pi}(r^2\sin^2\theta + z^2)\,kr\,d\theta\,dr\,dz$$

$$= k\int_0^h\int_0^a \pi r(2z^2+r^2)\,dr\,dz$$

$$= k\pi\int_0^h \left[r^2z^2+\frac{r^4}{4}\right]_0^a dz$$

$$= k\pi\int_0^h a^2z^2+\frac{a^4}{4}\,dz = k\pi\left[\frac{a^2z^3}{3}+\frac{a^4z}{4}\right]_0^h$$

$$= k\pi\left[\frac{a^2h^3}{3}+\frac{a^4h}{4}\right] = \boxed{\frac{k\pi[a^2h](3a^2+4h^2)}{12}}$$