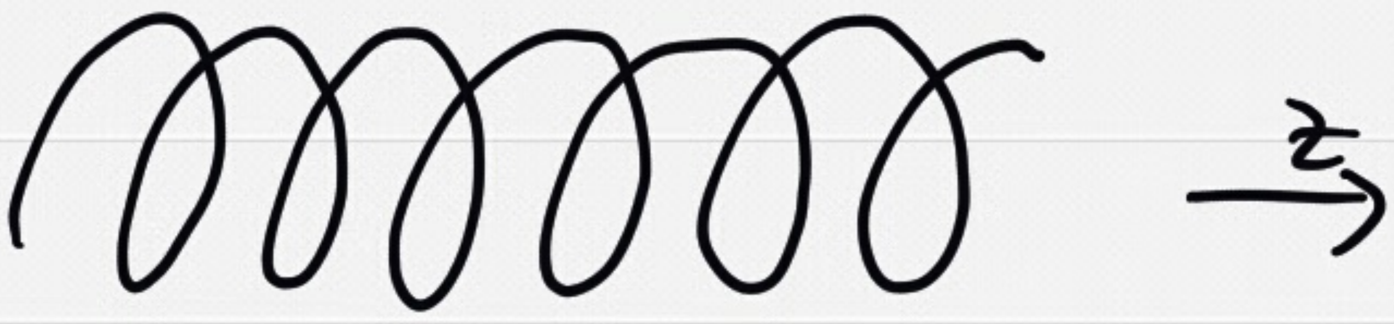
1.a.



$$\vec{B} = \mu_0 n I_s \hat{z}$$
$$= \mu_0 n K t \hat{z}$$

$$\mathcal{E}_{ind} = -d\Phi_B/dt$$
$$= -d/dt\,(B \cdot \pi a^2)$$
$$= -\pi a^2\, dB/dt$$
$$= -\pi a^2 \cdot \mu_0 n \cdot dI_s/dt$$
$$= \boxed{-\pi a^2 \cdot \mu_0 n \cdot K} \quad \text{CCW}$$

b. $$I_c(t) = \mathcal{E}/R = (V_0 + \mathcal{E}_{ind})/R$$
$$= \boxed{(V_0 - \pi a^2 \mu_0 n \cdot K)/R}$$

2.a. $$\vec{E} = -\nabla V$$

Note: L = h

$$= \Delta V/L\ \hat{z} = \boxed{V_0 \sin(\omega t)/L\ \hat{z}}$$

b. $$\oint \vec{B} \cdot d\vec{l} = \mu_0 \varepsilon_0\, d/dt \int \vec{E} \cdot d\vec{a}$$
$$B \cdot 2\pi s = \mu_0 \varepsilon_0\, d/dt\ \frac{V_0 \sin(\omega t) \cdot \pi s^2}{L}$$
$$\Rightarrow \boxed{\vec{B} = \frac{\mu_0 \varepsilon_0 \omega V_0 \cos(\omega t) \cdot s}{2L}\,\hat{\varphi}}$$

2c. $$\vec{S} = \frac{1}{\mu_0}(\vec{E} \times \vec{B})$$
$$= \frac{1}{\mu_0} \cdot \frac{V_0 \sin(\omega t)}{L}\ \frac{\mu_0 \varepsilon_0 \omega V_0 \cos(\omega t) s}{2L}\ \hat{z} \times \hat{\varphi}$$
$$= \boxed{-\frac{\varepsilon_0 \omega V_0^2 \sin(\omega t) \cos(\omega t)\, s}{2L^2}\,\hat{s}}$$

2d. $u = \frac{1}{2}\varepsilon_0 E^2 + B^2/2\mu_0$

$$= \frac{1}{2}\varepsilon_0 \frac{V_0^2 \sin^2(\omega t)}{L^2} + \frac{1}{2\mu_0}\frac{\mu_0^2\varepsilon_0^2\omega^2 V_0^2 \cos^2(\omega t) s^2}{4L^2}$$

$$= \boxed{\frac{1}{2}\varepsilon_0 \frac{V_0^2}{L^2}\left[\sin^2(\omega t) + \left(\frac{\omega}{c}\right)^2 \frac{s^2}{4}\cos^2(\omega t)\right]}$$

2e. $u \sim \frac{1}{2}\varepsilon_0 V_0^2/L^2 \sin^2(\omega t)$

$$\partial u/\partial t \sim \varepsilon_0 \frac{V_0^2}{L^2}\cdot\omega \sin(\omega t)\cos(\omega t)$$

$$-\nabla\cdot\vec{S} = -\frac{1}{s}\,\partial/\partial s\,(s S_s)$$

$$= \frac{\varepsilon_0 \omega V_0^2 \sin(\omega t)\cos(\omega t)}{2L^2 s}\,\partial/\partial s\,(s^2)$$

$$= \frac{\varepsilon_0 \omega V_0^2 \sin(\omega t)\cos(\omega t)}{L^2} = \partial u/\partial t \;//$$

3a. $\vec{g} = \varepsilon_0(\vec{E}\times\vec{B}) = \varepsilon_0\left[E_0\cos(kz-\omega t)\hat{y} \times \frac{E_0}{c}\cos(kz-\omega t)\,\hat{z}\times\hat{y}\right]$

$$\Rightarrow g_0 = \varepsilon_0 E_0^2/c$$

$$\text{or}\quad E_0 = \sqrt{c g_0/\varepsilon_0}$$

so
$$\boxed{\begin{aligned}\vec{E} &= \sqrt{\frac{c g_0}{\varepsilon_0}}\cos(kz-\omega t)\,\hat{y}\\ \vec{B} &= -\sqrt{\frac{g_0}{c\varepsilon_0}}\cos(kz-\omega t)\,\hat{x}\end{aligned}}$$

3b. $T_{zz} = \varepsilon_0(E_z E_z - \frac{1}{2}E^2) + \frac{1}{\mu_0}(B_z B_z - \frac{1}{2}B^2)$

$$= -\frac{1}{2}\varepsilon_0 E^2 - B^2/2\mu_0$$

$$= -\frac{1}{2}\left[\varepsilon_0\frac{c g_0}{\varepsilon_0} + \frac{1}{\mu_0}\frac{g_0}{\varepsilon_0 c}\right]\cos^2(kz-\omega t)$$

$$= \boxed{-c g_0 \cos^2(kz-\omega t)}$$

3c. $\vec{F} = \int T_{zz} \cdot -da_z$

unit normal in $-z$

$$= \boxed{A c g_0 \cos^2(kz - \omega t)\,\hat{z}}$$

Note: There is also a dg/dt term but it averages to zero
I didn't hold it against you if you didn't calculate it.

3d. $P = \langle F \rangle / A = c g_0 \langle \cos^2(kz - \omega t) \rangle$

$$= \frac{1}{2} c g_0$$

should have $P = \langle S \rangle / c$

$$= \frac{\langle g \rangle c^2}{c}$$

$$= \langle g \rangle c$$

$$= \frac{1}{2} g_0 c \quad //$$