Chapter 11, Solution 11.

$$\omega = 377, \qquad R = 10^4, \qquad C = 200 \times 10^{-9}$$
$$\omega RC = (377)(10^4)(200 \times 10^{-9}) = 0.754$$
$$\tan^{-1}(\omega RC) = 37.02^\circ$$

$$Z_{ab} = \frac{10k}{\sqrt{1 + (0.754)^2}} \angle -37.02^\circ = 7.985 \angle -37.02^\circ \ k\Omega$$

$$i(t) = 33\sin(377t + 22^\circ) = 33\cos(377t - 68^\circ)\ mA$$
$$\mathbf{I} = 33\angle -68^\circ \text{ mA}$$
$$S = \frac{I^2 Z_{ab}}{2} = \frac{\left(33x10^{-3}\right)^2 (7.985 \angle -37.02^\circ) \times 10^3}{2}$$
$$\mathbf{S} = 4.348\angle -37.02^\circ \text{ VA}$$

$$P = |S|\cos(37.02) = \mathbf{3.472\ W}$$