1. (a)

   (b)
   $$L_4 = \frac{L_2 R_3}{R_1}$$

   (c)
   $$L_4 = \frac{C_1 R_2 R_3}{1 + (\omega R_1 C_1)^2}$$

   (d)
   $$L_4 = C_1 R_2 R_3, \quad R_4 = \frac{R_2 R_3}{R_1}$$

2. (a)
   $$|4R_L| \geq |4sL + 4R_L + s^2 LC(sL + 2R_L)|$$

   (b)
   $$v_l = 100.487\angle -0.97^\circ$$

3. (a)
   $$|2R_L| \geq |2sL + 2R_L + s^2 LCR_L|$$

   (b)
   $$v_l = 110.883\angle -1.95^\circ$$

4.
   $$v_l = 130.325\angle -2.53^\circ$$

5.
   $$v_l = 1.587\angle 84.572^\circ$$

6.
   $$P_l = 23.189\angle -148.138^\circ$$
   $$P_l = 64.713\angle 81.45^\circ$$