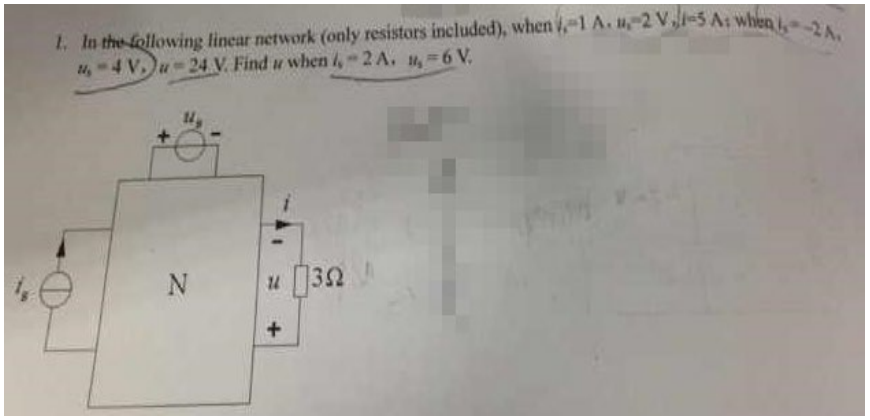
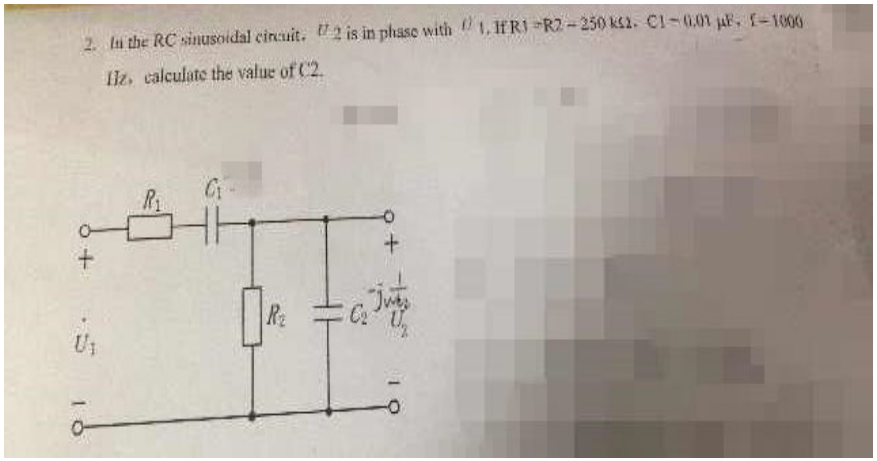
Circuit Model Test II

(Solve the following questions in 90 minutes).

1. In the following linear network (only resistors included), when i_s=1 A, u_s=2 V, i=5 A; when i_s=−2 A, u_s=4 V, u=24 V. Find u when i_s=2 A, u_s=6 V.



2. In the RC sinusoidal circuit, $\dot{U}_2$ is in phase with $\dot{U}_1$. If R1 =R2 = 250 kΩ, C1 = 0.01 μF, f = 1000 Hz, calculate the value of C2.



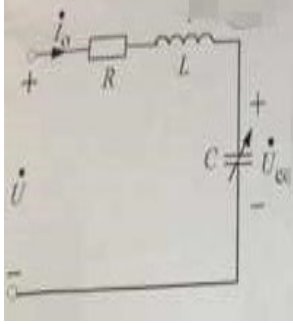
3. The average power of the balanced three-phase loads is 2.4 kW, the power factor is 0.6 (Lagging), the line voltage is 380 V, find

(1) Line current;

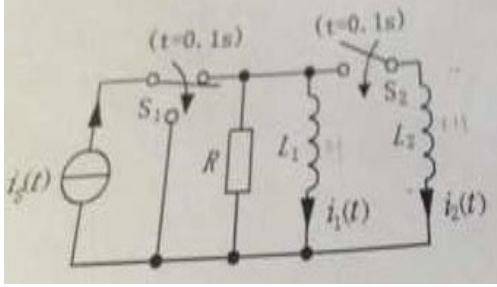
(2) Z_Y;

(3) Z_Δ.

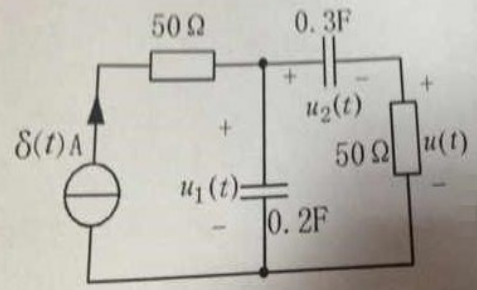
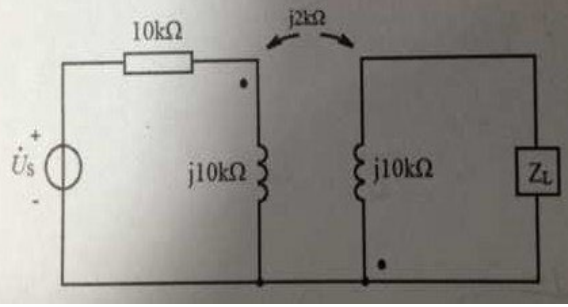
4. U = 10 V, ω = 3 000 rad/s. To adjust C and make the circuit into resonance, the resonant current I_0 = 100 mA, U_{C0} = 200 V. Find R, L, C and Q.



5. In the following circuit, $i_s(t)=e^{-10t}\varepsilon(t)$ A, $R=20\,\Omega$, $L_1=1$ H, $L_2=2$ H. Find $i_1(t)$ and $i_2(t)$.



7. Redraw the circuit in S-domain and find $u(t)$、$u_1(t)$和 $u_2(t)$



6 Calculate the maximum transfer power and the complex load.