B107021131 陳瑞服

台灣科技大學一百零八學年度下學期平時考（一）

科目名稱：電路學(二)　開課系所：電子系 ET2104301　地點：國際大樓 IB306

考試時間：109 年 3 月 26 日 下午 13:20 至 15:10 (可使用工程計算機)

1. (15%) Please find I_o in Fig. 1.

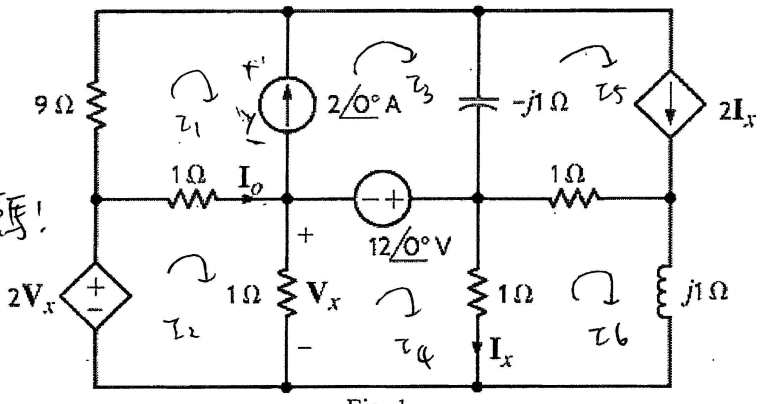

Fig. 1.

2. (15%) Please use nodal analysis to find I_o in Fig. 2.

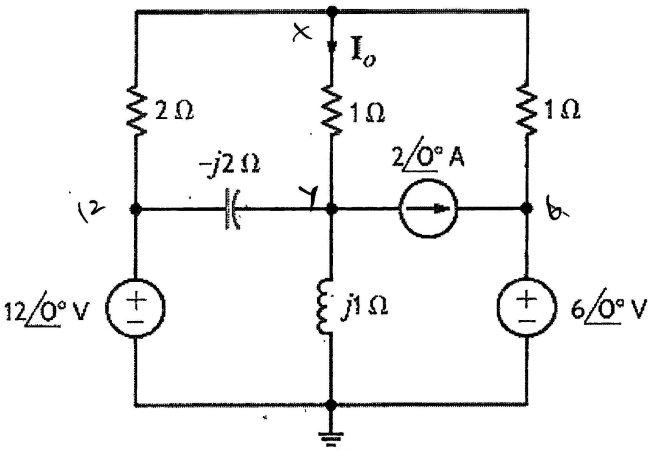

Fig. 2.

3. (20%) If Z_L has unity power factor feature, please find Z_L for maximum power transfer and the maximum power that can be transferred to the load Z_L in Fig. 3.

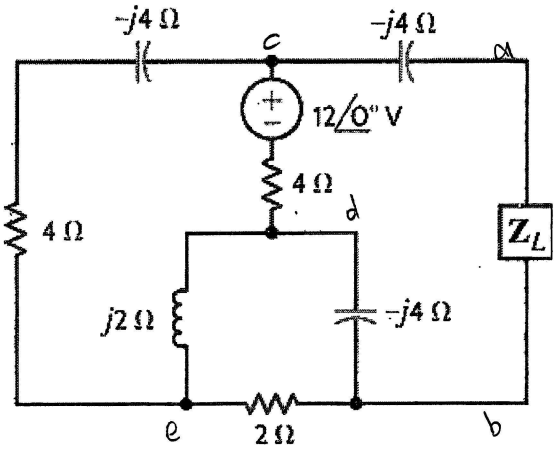

Fig. 3.

4. (15%) Given the circuit in Fig. 4, please find the complex power supplied by the source, and the source power factor. If $f = 60\text{Hz}$, please find V_s.

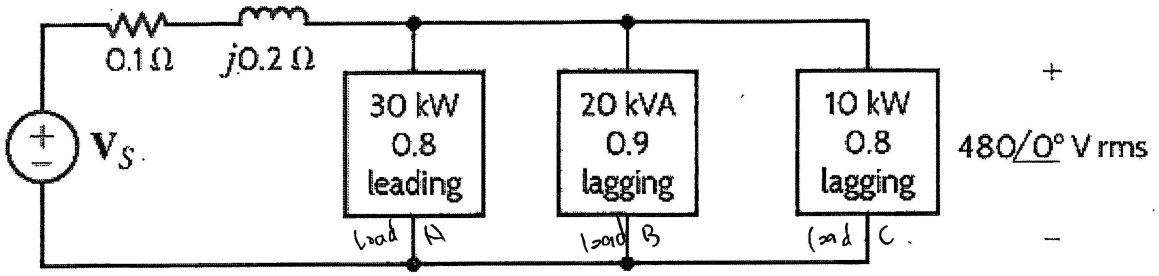

Fig. 4.

5. (15%) In a balanced three-phase wye-wye system, the source is an abc-sequence set of voltages and $V_{an} = 120\angle 40^\circ$ V rms. If the a-phase line current and line impedance are known to be $7.1\angle -10.28^\circ$ A rms and $0.8 + j1\Omega$ respectively, find the load impedance.

6. (10%) An *abc*-phase-sequence three-phase balanced Y-connected source supplies power to a balanced Δ-connected load. The impedance per-phase in the load is $20 + j14\Omega$. If the source voltage for the a phase is $\mathbf{V}_{an} = 120\angle 70^\circ$V rms and the line impedance is zero, please find the phase currents in the Y-connected source.

7. (10%) A balanced three-phase source supplies power to three loads: The loads are

   Load 1: 30 kVA at 0.8 pf lagging

   Load 2: 24 kW at 0.6 pf leading

   Load 3: unknown

   If the line voltage and total complex power at the load are 208 Vrms and $120\angle 0^\circ$kVA, respectively, please find the complex power and the power factor of the unknown load.