台灣科技大學一百零七學年度下學期期中考

科目名稱：電路學(二)　開課系所：電子系 ET2104301　地點：國際大樓 IB308

考試時間：108 年 4 月 11 日　下午 13:20 至 15:10 (雙面試題，可使用工程計算機)

1. (10%) Please use nodal analysis to find V_o in Fig. 1.

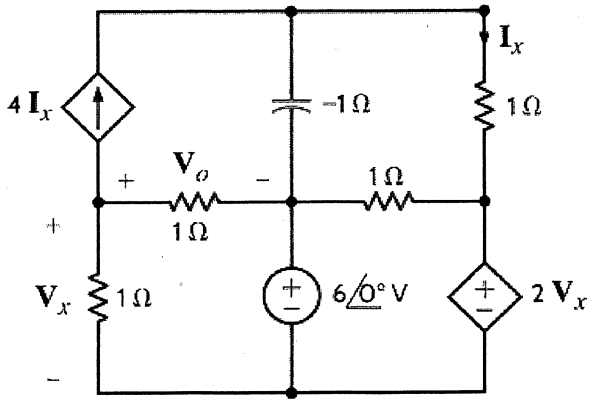

Fig. 1.

2. (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. 2.

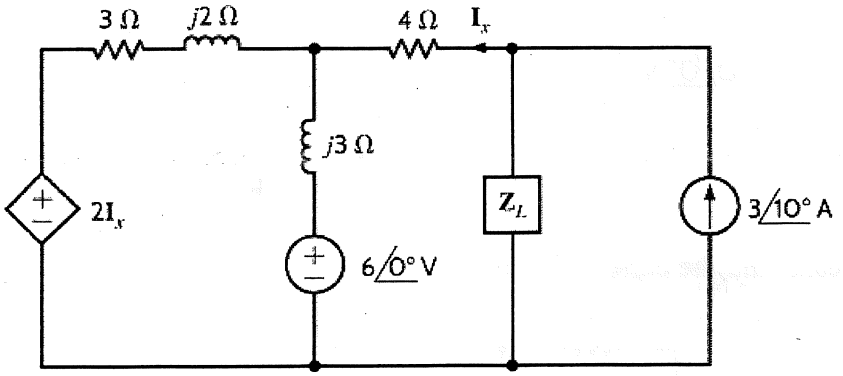

Fig. 2.

3. (20%) A balanced Y-connected load and a balanced Δ-connected load are supplied by a three-phase 480-V 50Hz generator. The branch impedances of the Y and Δ loads are $15\angle 20^{\circ}\Omega$ and $25\angle -40^{\circ}\Omega$, respectively.

(a)Please determine the active and reactive powers drawn by each three-phase loads. (10%)

(b)Please determine the phasor voltage and phasor current for any one branch of each three-phase load, and substitute into the power equation for balanced three-phase loads. Given that the phase angle for Y system V_{AN} is 30° and the phase angle for Δ system V_{AB} is 0°. (10%)

4. (10%) A balanced three-phase source supplies powers to three loads:
Load 1: 36kW at 0.8 pf leading Load 2: 10kVA at 1.0 pf
Load 3: unknown
If the line voltage at the load is $208V_{rms}$, the magnitude of the total complex power is ~~44.4~~ 60 kVA, and the combined power factor at the load is 0.84 lagging.
Please find (a) the unknown load, and its power factor (Please specify whether it is leading or lagging).

5. (20%) Please find the current $\mathbf{I}_o$ in Fig. 5

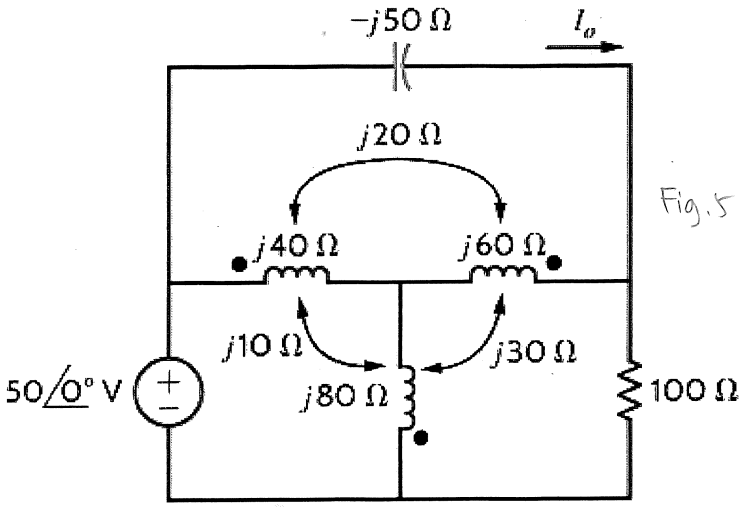

Fig. 5

6. (20%) Please find the ~~current~~ voltage V_o in Fig. 6

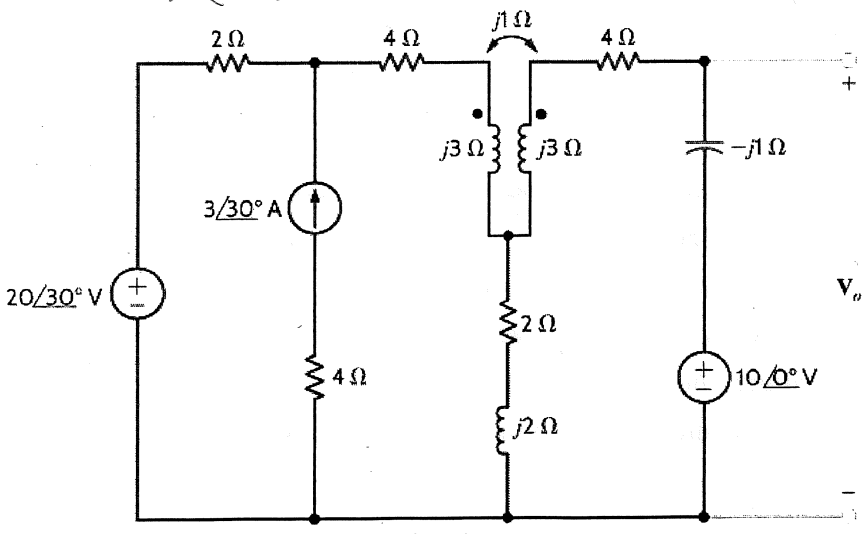

Fig. 6.