

國立臺北科技大學

九十五學年度電資碩士在職專班招生考試

甲組：電路學試題

填准考證號碼

第一頁 共二頁

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注意事項：

1. 本試題共【五】題，配分共 100 分。
2. 請按順序標明題號作答，不必抄題。
3. 全部答案均須答在答案卷之答案欄內，否則不予計分。

#1. Obtain the complete voltage response of $v(t)$ as shown in Fig. 1. Assuming

$$i_s(t) = 40e^{-3t}u(t) \text{ (Amp) and } i_s(0^-) = 0 \quad (22 \%)$$

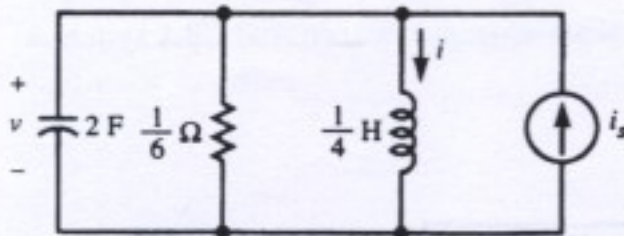


Fig. 1

#2. Refer to Fig. 2 (18 %)

- (a) Find the value of impedance Z_L such that maximum power is transferred to load Z_L .
- (b) Compute the above (average) power transferred to the load.

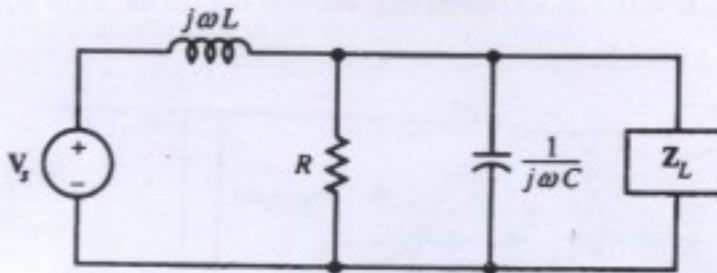


Fig. 2

Given that

$$\omega = 10 \text{ Mrad/Sec}, R = 2 \Omega, C = 0.1 \mu\text{F}, L = 0.2 \mu\text{H} \text{ and } V_s = 10 \angle 37.6^\circ \text{ mV}$$

#3. Refer to Fig. 3 (16 %)

- (a) Find the resonant frequency, ω_0 , of the parallel circuit in Fig. 3.
- (b) If the inductance L can be varied, find its value at the circuit resonance.

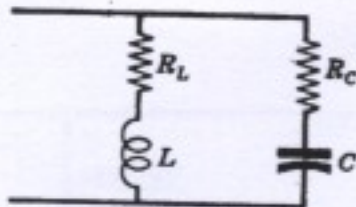


Fig. 3

注意:背面尚有試題

#4 (18 %)

- (a) Apply KCL at nodes 1, 2 and 3 as shown in the circuit below (Fig. 4a), and obtain the nodal equations.
- (b) Apply KVL to loops 1, 2, and 3 as shown in Fig. 4b, and obtain the loop equations.
- (Note: You don't need to solve the above equations!)

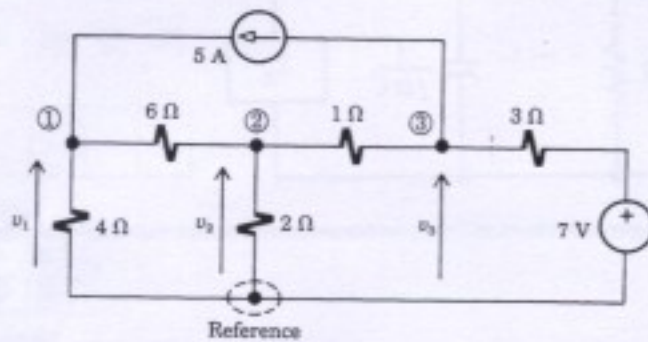


Fig. 4a

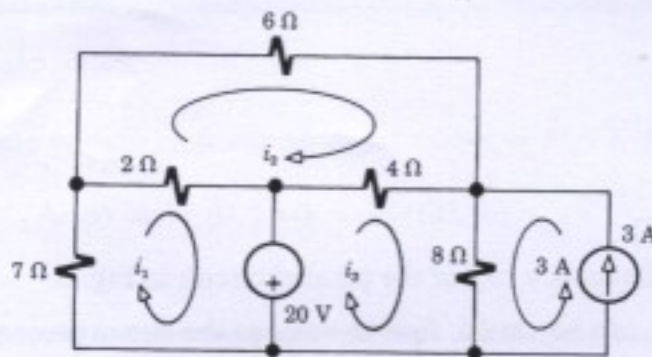


Fig. 4b

#5. (26%)

- (a) A three-phase, three-wire, 100 volt, ABC system supplies a balanced delta-connected load with impedance of $20 \angle 45^\circ$ ohms (refer to Fig. 5a). Determine the line currents and draw the phasor diagram.

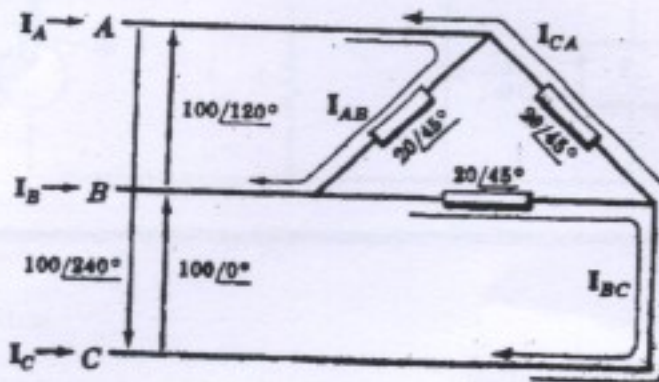


Fig. 5a

- (b) A three-phase, four wire, 208 volt, CBA system has a wye-connected load with $Z_A = 6 \angle 0^\circ$, $Z_B = 6 \angle 30^\circ$, $Z_C = 5 \angle 45^\circ$ (refer to Fig. 5b). Obtain the three line currents and the neutral current. Draw the phasor diagram.

(Note that ABC system = positive phase-sequence system; And CBA system = negative phase-sequence system).

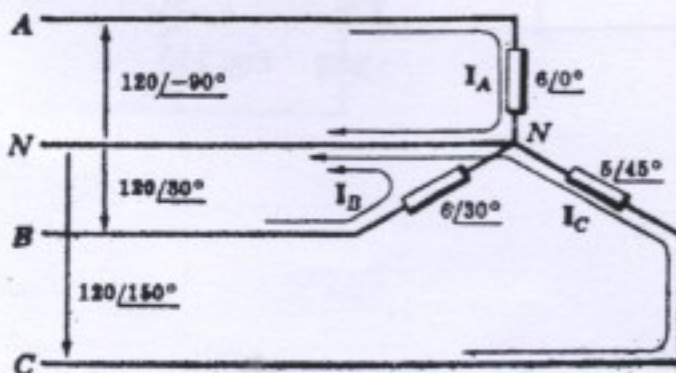


Fig. 5b