系所組別：電機工程學系丙組

考試科目：電路學　　考試日期：0222，節次：1

※ 考生請注意：本試題可使用計算機。　請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

1、Please calculate the maximum power that the circuit of **Figure 1** can deliver to a resistive load connected between A and B. (20%)

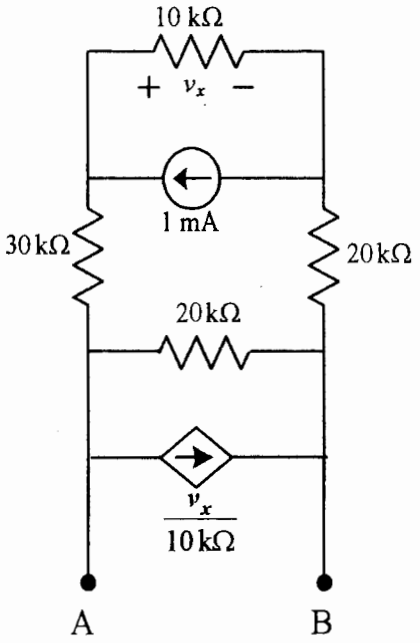

Figure 1

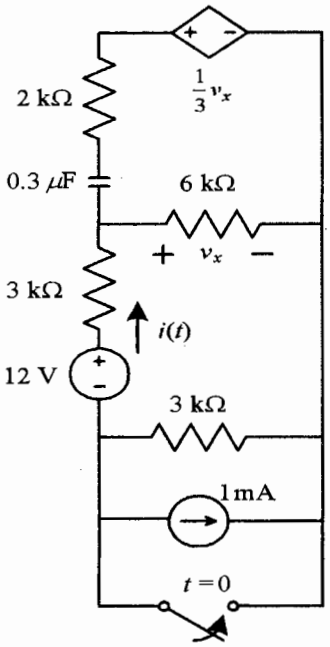

Figure 2

2、By assuming that the circuit of **Figure 2** is in steady state at $t = 0^-$, please find $i(t)$. (15%)

3、As shown in **Figure 3**, please calculate the current i indicated in this circuit. (15%)

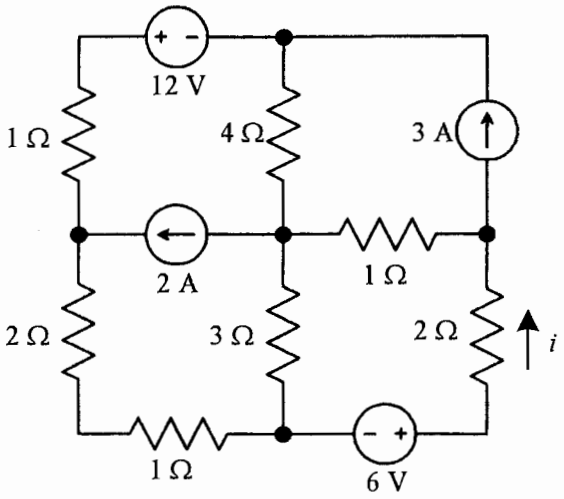

Figure 3

(背面仍有題目，請繼續作答)

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4、The circuit shown in **Figure 4** is used to obtain maximum power transfer to the loading resistance R_L by means of adjusting the variable capacitive reactance X.

(1) Determine the value of X if R_L is 20 Ω. (10%)

(2) Solve the value of R_L if X is 0 Ω. (10%)

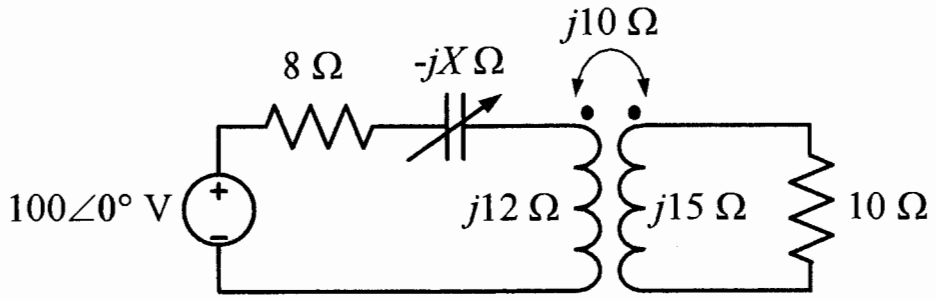

Figure 4

5、**Figure 5** shows a three-phase balanced AC voltage source with positive phase sequence supplying a three-phase unbalanced load ($\mathbf{Z}_a = j5\ \Omega$, $\mathbf{Z}_b = 10\ \Omega$, and $\mathbf{Z}_c = -j10\ \Omega$). Assume the root-mean-square value of the three-phase AC voltage source is 240 V. Take $\mathbf{V}_a$ as the reference.

(1) Find the three line currents $\mathbf{I}_a$, $\mathbf{I}_b$, and $\mathbf{I}_c$. (10%)

(2) Obtain the readings of the two wattmeters that are properly connected at lines a and c. (10%).

(3) Determine the total complex power absorbed by the unbalanced load. (10%)

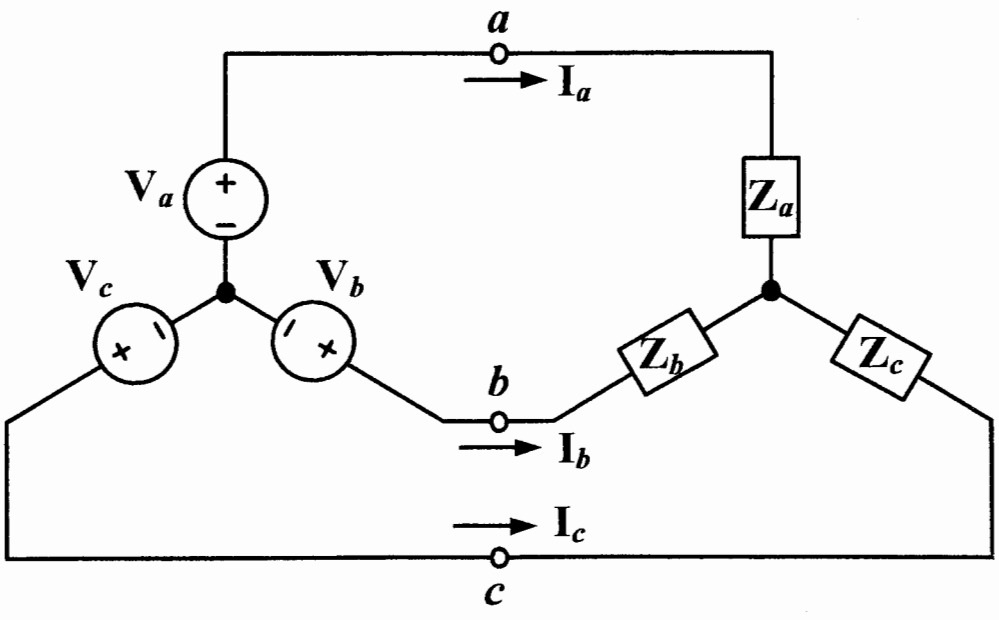

Figure 5