1. In the circuit of Figure 1, the maximum power that a resistive load can absorb from the circuit is P_{AC} if the load is connected between nodes A and C, while the maximum power that a resistive load can absorb from the circuit is P_{BD} if the load is connected between nodes B and D. Please compute the value of $P_{AC} - P_{BD}$　(20 %)
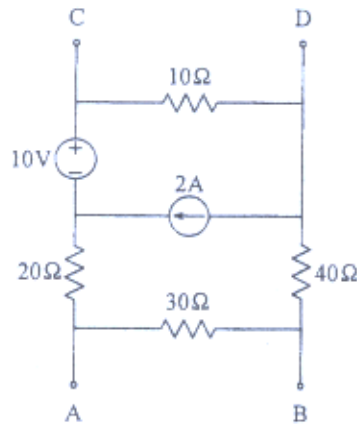

Figure 1

2. After having been closed for a long time, the switches of Figure 2 are opened simultaneously at $t=0$. Find the voltage $v_1(t)$ across $1\,\mu F$ capacitor for $t \geq 0$.　(15 %)
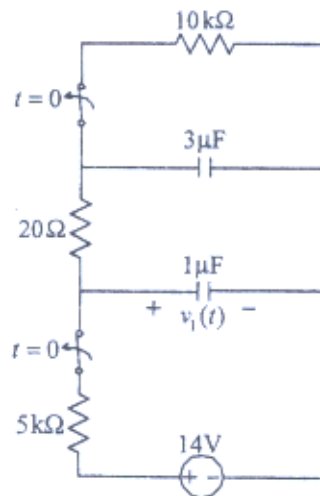

Figure 2

3. In Figure 3, at the time when the R_1 is adjusted to be the value for the maximum power transfer, please calculate the power delivered from the 280V source.　(15 %)
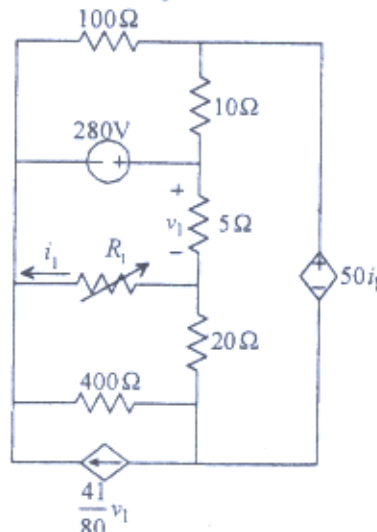

Figure 3

（背面仍有題目,請繼續作答）

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4. The load on the linear transformer shown in the following circuit is a capacitance of value C2. The voltage V1 is supplied by a voltage source.
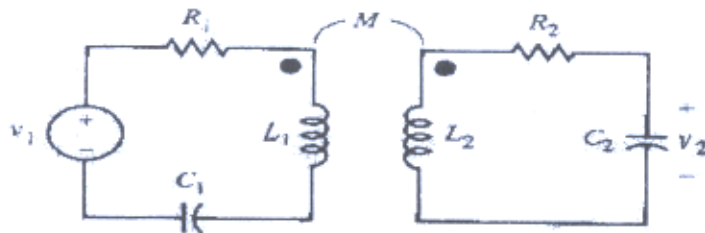
    (a) Calculate the transfer function V2/V1. (5%)

    (b) Define $\omega_0 = 1/\sqrt{L_2 C_2} = 1/\sqrt{L_1 C_1}$, $Q_1 = \omega_0 L_1 / R_1$, $Q_2 = \omega L_2 / R_2$ and

       $k = M / \sqrt{L_1 L_2}$. Write the transfer function in a form that does not contain M,

       L_1, $L2$, or C_1. (10%)

    (c) Define k_c to be the value of k for which $\left| V_2 / V_1 \right|$ is a maximum at $\omega = \omega_0$.

       Develop an expression for k_c in terms of Q_1 and Q_2. (5%)

5. The following circuit can be used to check for the phase sequence of a balanced three-phase voltage. Assume that the voltmeter is ideal (draws no current) and indicates rms values and that the line-to-line voltage is 208 V. Find the voltmeter reading for an *abc* phase sequence and an *acb* phase sequence. In practice, the voltmeter is often replaced by a small neon lamp and series resistance. The brightness of the lamp is used to indicate the phase sequence. (15%)
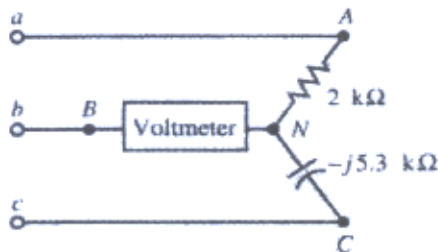
6. For following figure, $V_{an} = 120V\angle 0^\circ$. Compute the readings of each wattmeter and determine the total power of this system. (15%)