※ 考生請注意：本試題可使用計算機

1. As shown in Fig. 1, the switch S is opened at $t = 0$s after being closed a long time, and re-closed at $t = 1$s. Please describe $v(t)$ for $t >= 0$ s. (10%)
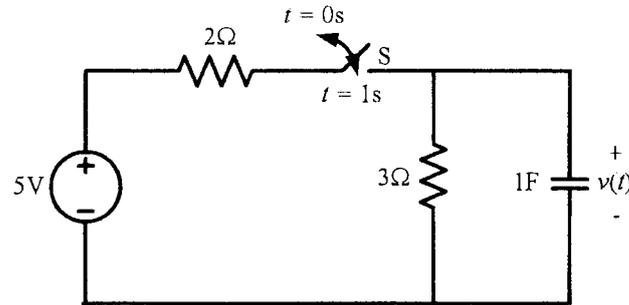

Fig. 1

2. As shown in Fig. 2, let $u(t) = 40+50\sin(10t)$ V.

   (a) As $R = 100\ \Omega$, what are $v(t)$ and the power dissipated by R? (10%)

   (b) If we would like to have R obtain maximal power from $u(t)$, what should the resistance R be and what is the maximal power? (10%)
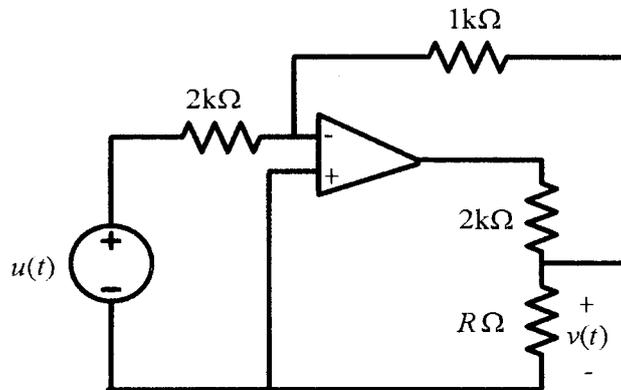

Fig. 2

3. Suppose the switch S in Fig. 3 is opened at $t = 0$ s after being closed a long time. Find $v(t)$, for $t >= 0$ s. (20%)
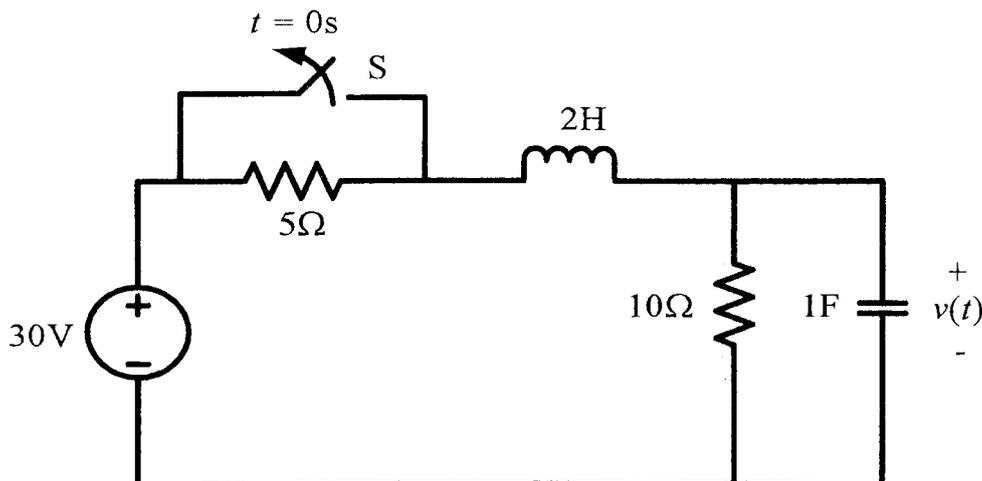

Fig. 3
(背面仍有題目，請繼續作答)

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4. For the circuit shown in Fig. 4, assume $R = 10\ \Omega$, $L = 10\ \text{H}$, $C = 0.1\ \text{F}$, $v_s(t) = 10\cos(t)\ \text{V}$, and $i_s(t) = 5\sin(t)$

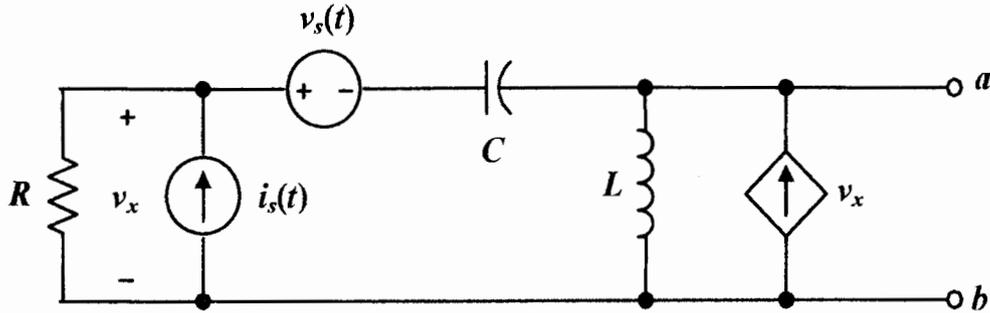A. Obtain Thevenin and Norton equivalent circuits at terminals a-b. (20%)

Fig. 4

5. Two three-phase balanced loads shown in Fig. 5 are powered by a balanced three-phase source with a line voltage of 480 V through transmission lines. If $\mathbf{Z}_{\text{line}} = 1 + j2\ \Omega$, $\mathbf{Z}_\Delta = 9 - j12\ \Omega$, and $\mathbf{Z}_Y = 5 + j12\ \Omega$,

(a) determine the magnitude of the line current supplied by the source (10%), and

(b) calculate the active power, reactive power, apparent power, and power factor supplied by the source (10%)
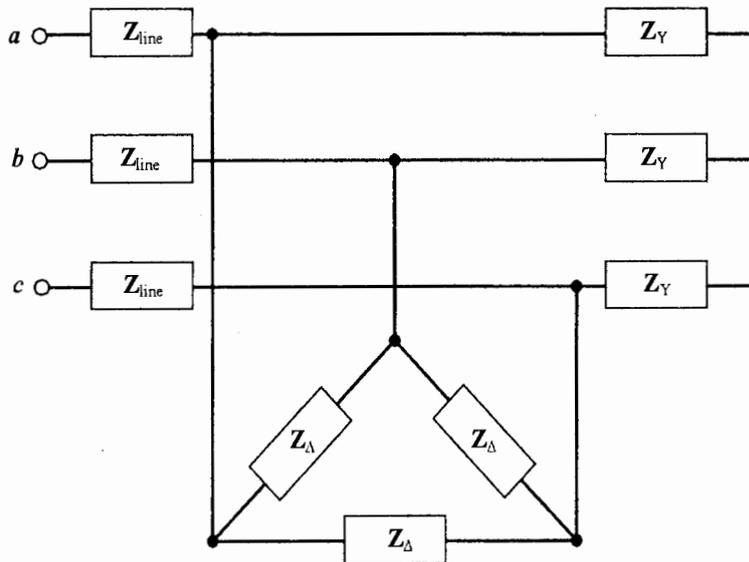

Fig. 5

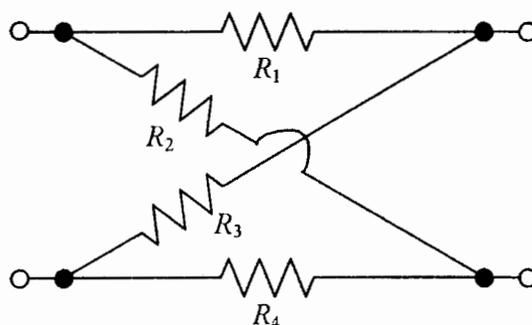6. Determine z (impedance) parameters for the circuit shown in Fig. 6. (10%)

Fig. 6