※ 考生請注意:本試題 ☑可 □不可 使用計算機

1. For the circuit shown in Fig. P1, please determine:

(a) As $Z = 10\Omega$ and $v_s = 10V$, what is the output voltage of v_o? (10%)

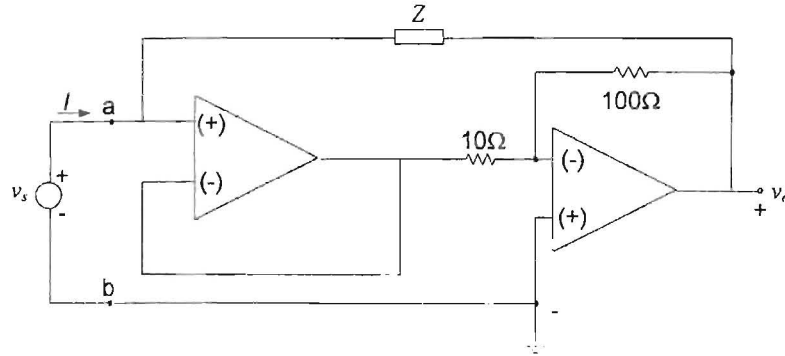(b) As $Z = 100uF$, what is the transfer function of v_o/v_s? (10%)

Fig. P1

2. Suppose in Fig. P2 the solar photovoltaic (PV) module has an open-circuit voltage of 90V and a short-circuit current of 3A in noonday sun. Assume the solar PV module is a linear circuit, though it may not be a very close approximation. As shown in the figure, the Solar PV module is used to charge a battery via a maximum–power tracker for maximum charging power. In the same noonday sun as above, please determine:

(a) What current should the maximum–power tracker require from the solar PV module? (5%)

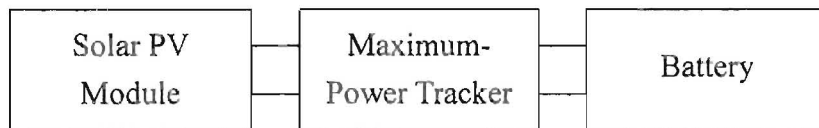(b) If the efficiency of the maximum–power tracker is 95%, what is the output power of the power tracker? (5%)

Fig. P2

3. In Fig. P3, the switch S_1 has been closed for a very long time and is opened at $t = 0$. Please determine $v(t)$ for $t >= 0$. (20%)
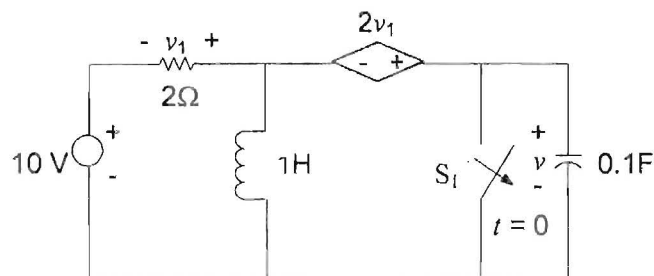

Fig. P3

系所組別： 電機工程學系丙組

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4. For the circuit shown in Fig. P4, the three-phase balanced Δ-connected load has impedance of $Z_\Delta = 60 + j80$ Ω/phase and the load is connected to a three-phase, 880 V, 60 Hz, acb-sequence balanced source. Determine:

(a) the readings of the two wattmeters W_1 and W_2 and (10%)

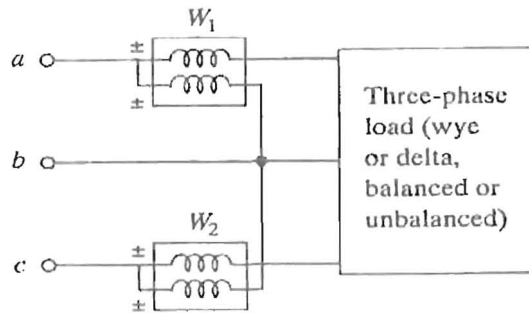(b) the total active power P_T and the total reactive power Q_T of the load. (10%)

Fig. P4

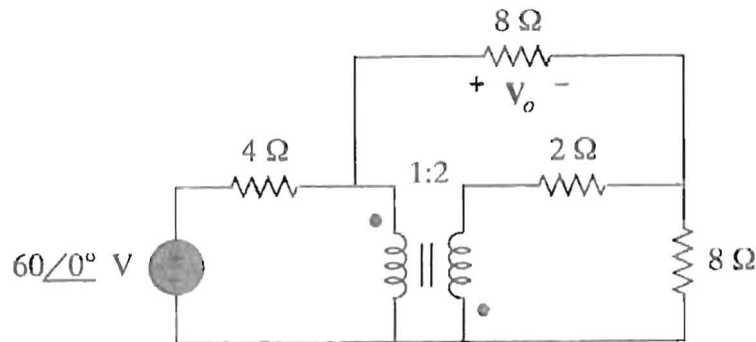5. For the ideal transformer circuit shown in Fig. P5, find the voltage V_o. (15%)

Fig. P5

6. If the current $i(t)$ shown in Fig. P6 flows through a 100-Ω resistor, calculate the effective value and the average value of the current and the average power absorbed by the resistor. (15%)
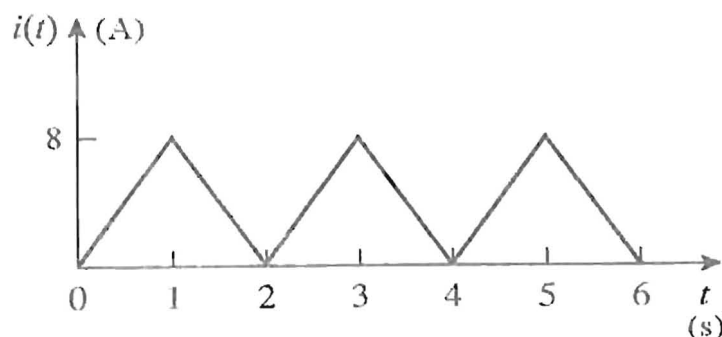

Fig. P6