※ 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. Find the Thevenin equivalent of the circuit in Fig. 1 at terminals *a-b*. (10%)

2. A resistance array is connected to a load resistor R_L and a 9-V battery as shown in Fig. 2.
   (a) Find the value of R_L such that $V_o = 1.8$ V. (15%)
   (b) Calculate the value of R_L that will draw the maximum current. What is the maximum current? (5%)

3. In the op amp circuit of Fig. 3, let $v_i(t) = u(t)$ V, $R_1 = R_2 = 10$ kΩ, and $C_1 = C_2 = 100$ μF.
   (a) What are the value of $v_o(0)$ and $v_o(\infty)$, respectively? (4%)
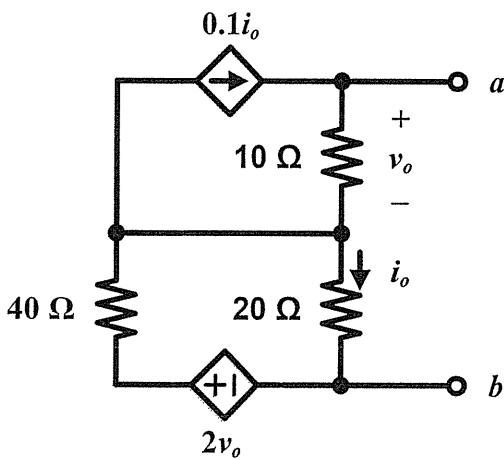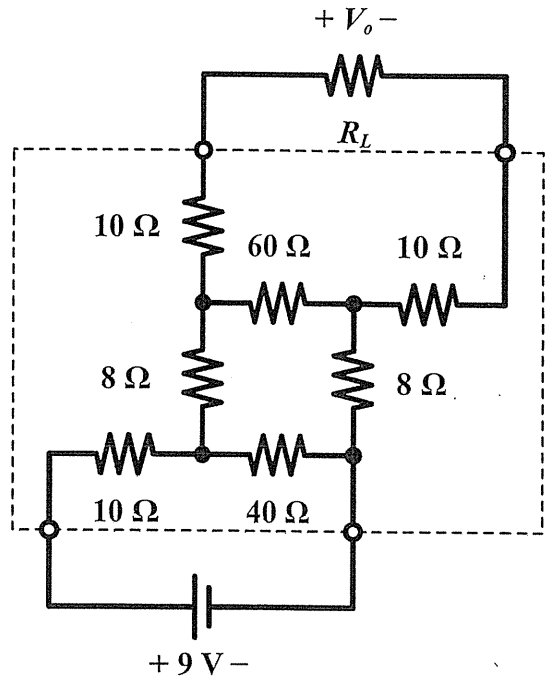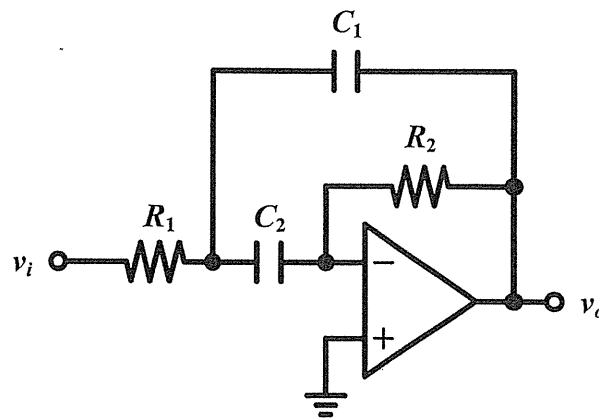   (b) Determine $v_o(t)$ for $t > 0$ s. (16%)

Fig. 1

Fig. 2

Fig. 3

4. The circuit shown in Fig. 4 contains four passive elements and an ideal transformer with turns ratio of 2:1. Please derive the admittance parameters or y parameters as a function of s. (20%)
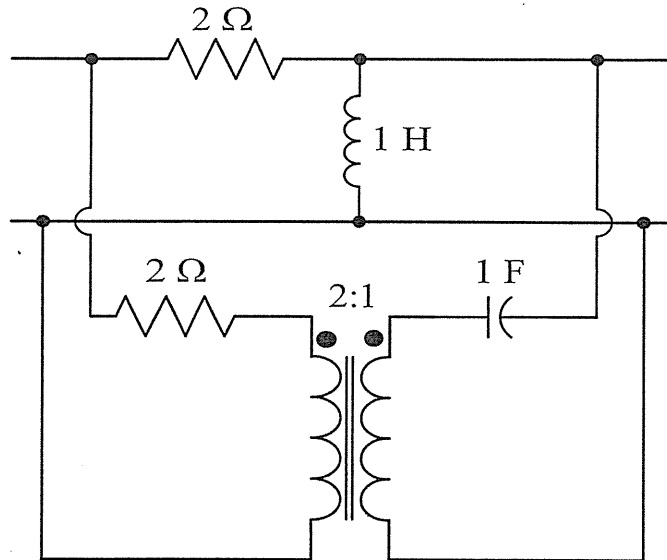

Fig. 4

5. A three-phase Y-connected induction-motor load with per-phase impedance of $80 + j60$ Ω is properly connected to a balanced three-phase power source of 208 V, 60 Hz, negative sequence. Two wattmeters are properly connected to measure the absorbed power of the load.
   (a) Please find the readings of the two wattmeters (5%).
   (b) Please determine the line-current magnitude, total active power, and total reactive power absorbed by the induction-motor load. (15%)

6. For the circuit shown in Fig. 6, $i(t) = 20 + 16\cos(10t + 45°) + 12\cos(20t - 60°)$ mA.
   (a) Please solve for the voltage $v(t)$. (5%)
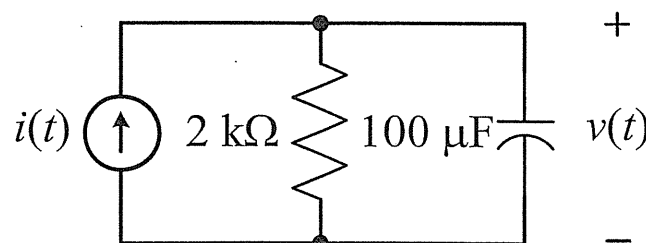   (b) Please calculate the average power dissipated in the resistor of 2 kΩ. (5%)

Fig. 6