1. Find the Norton equivalent circuit of the circuit in Fig. 1 at terminals a-b. (15%)

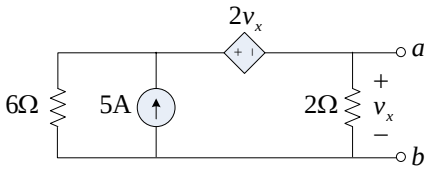

Fig. 1

2. The circuit in Fig. 2 is for a difference amplifier. Calculate v_1, i_x, and v_o. (15%)

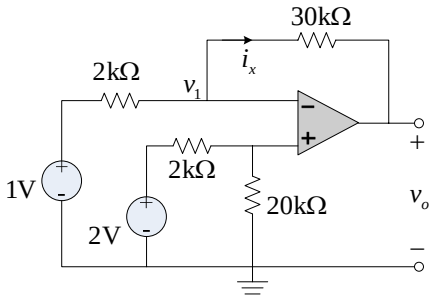

Fig. 2

3. The switch in Fig. 3 has been closed for a long time. It opens at $t = 0$. Find $i(t)$ for $t \geq 0$. (20%)

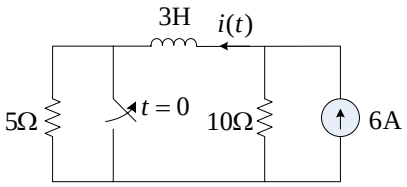

Fig. 3

4. For the circuit shown in Fig. 4. Find the steady state value of $i(t)$. (15%)

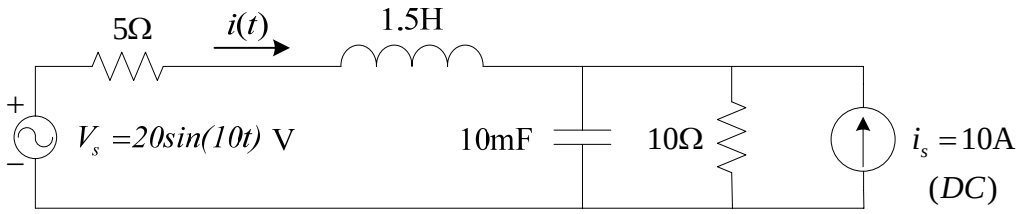

Fig.4

5. Assume the transformer in the circuit of Fig. 5 is ideal. Find the average power dissipated by the resistor R_2. （15%）

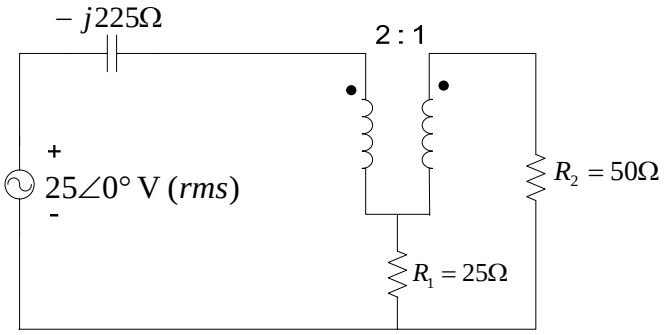

Fig. 5

6. Assume the OPA in the circuit of Fig. 6 is ideal in which $R = 10\,\mathrm{K}\Omega$ and $C = 1\,\mu\,\mathrm{F}$.

(a) Find the transfer function of $\dfrac{V_O(s)}{V_i(s)}$. （10%）

(b) Find the steady-state response of $v_o(t)$ if the input voltage $v_i(t) = 5\sin(t)$ V.（10%）

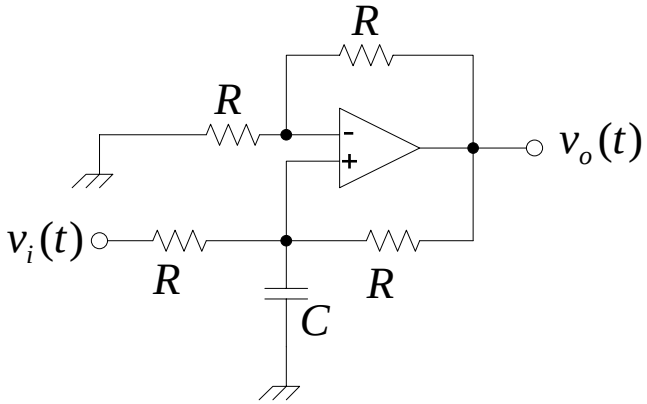

Fig.6