1. At room temperature $V_T = 0.026$ V, consider the circuit shown in Fig. 1(a). The cut-in voltage for the diode is $V_\gamma = 0$, its forward resistance $r_f = 0$.

10%   (a) Define and sketch the load line of diode in this circuit and find the working point of diode.

10%   (b) Sketch the steady-state output voltage v_o for the input signal v_i given for the circuit in Fig. 1(b).
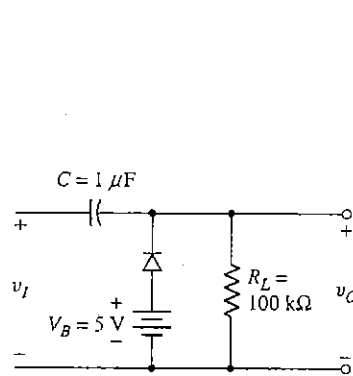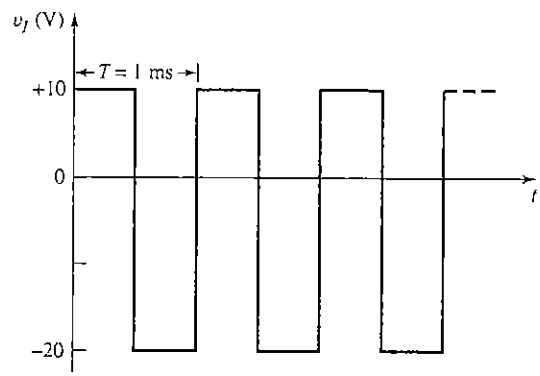

Fig. 1   (a)   (b)

2. For the circuit in Figure 2, the parameters are $V_{TN} = 1$ V and $Kn = 0.5$ mA/V^2 for transistors M_1 and M_2.

10%   (a) Define and sketch the load line of transistors M_1

10%   (b) Sketch the current-voltage characteristics of transistors M_2
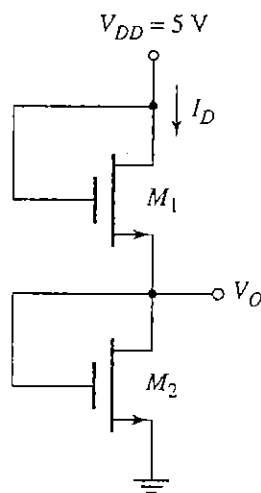

Fig. 2   Fig. 3
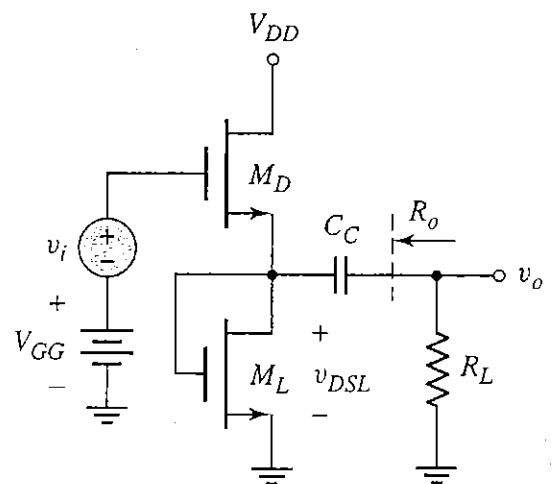
3. For the circuit shown in Fig. 3, assume small-signal output resistances of transistors r_{oL} are finite and r_{oD} is infinite.

10%   (a) Determine the small-signal voltage gain $A_v = v_o/v_i$.

5%   (b) Determine the output resistance R_o.

注意：背面有試題

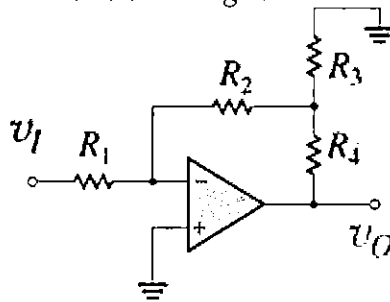15%　4.　Sketch the transfer characteristic of the circuit in Fig. 4.

Fig. 4

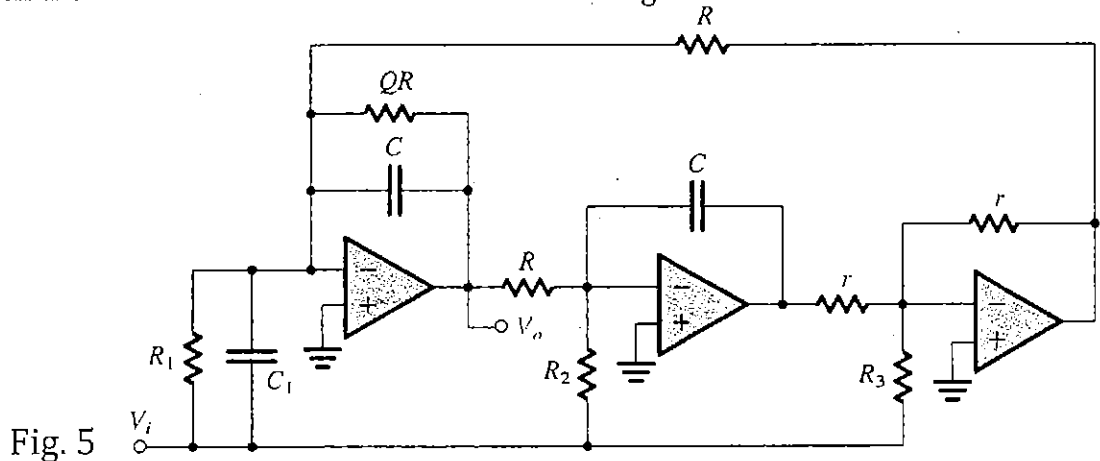20%　5.　Sketch the transfer characteristic of the circuit in Fig. 5.

Fig. 5

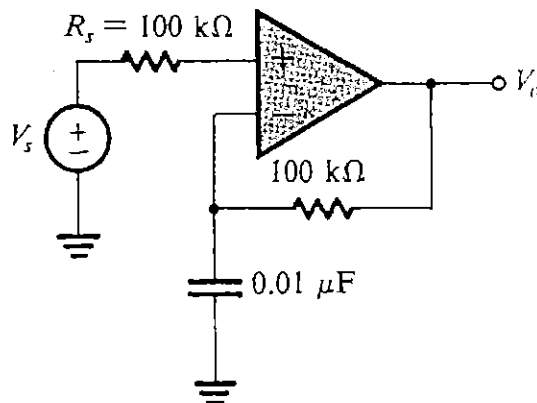10%　6.　Analyze the frequency response of the circuit in the figure 6, and sketch the Bode plot.

Fig. 6