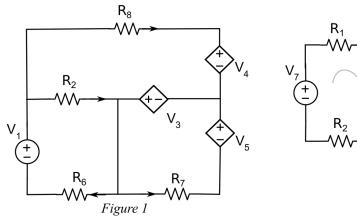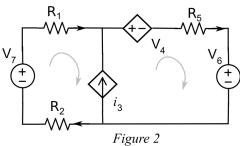# BASICS OF ELECTRICAL CIRCUITS
Midterm II

1. (**25 pts**) For the circuit given in Figure 1, obtain the equations to analysis the circuit using Chord (Line) current method such that unknown variables are i_6, i_7 and i_8 ($V_3 = \alpha i_4$, $V_4 = \beta V_8$, $V_5 = \beta i_7$).

2. (**25 pts**) For the circuit given in Figure 2, obtain the equations to analysis the circuit using generalized (modified) mesh current method ($i_3 = \alpha v_1$, $v_4 = v_5$).

3. (**25 pts**) For the circuit given in Figure 3, obtain the equations to analysis the circuit using Generalized Branch Voltages method such that unknown variables are v_1, v_2 and v_3 ($i_4 = \beta i_5$, $i_5 = v_5$).

4. (**25 pts**) (a) Find v_o in terms of v_1 and v_2. (b) The voltages $v_1 = 3\cos(t)$ and $v_2 = 5V$ are applied to the circuit shown in Figure 4. Sketch v_o versus t, assuming the opamp is ideal and $R_2 = 10k\Omega$, $R_1 = 5k\Omega$, $V_{sat} = 12V$ and $-V_{sat} = -12V$.
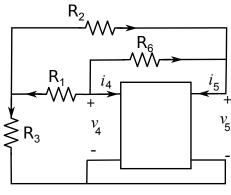

Figure 1

Figure 2

Figure 3

Figure 4