台灣科技大學一百零六學年度上學期平時考（一）

科目名稱：電路學(一)　開課系所：電子系 ET2103301　地點：國際大樓 IB501

考試時間：107 年 10 月 18 日 下午 13:20 至 15:10 (不可使用工程計算機)

1. (10%) Please find R_{AB} in Fig. 2. (4Ω)

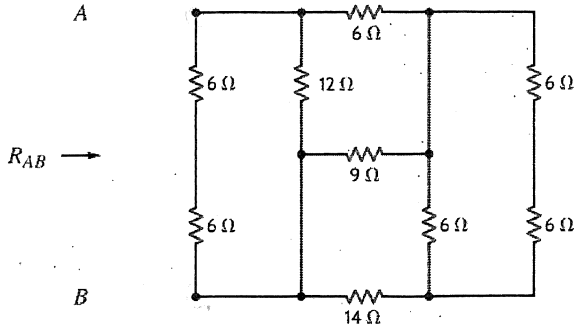
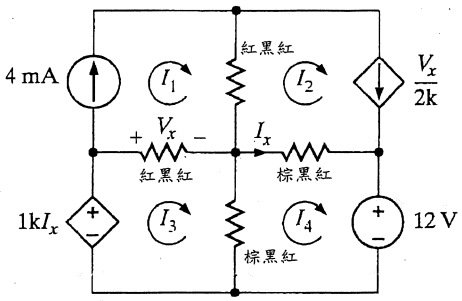


Fig. 1.

2. (15%) Please determine the currents of I_1, I_2, I_3 and I_4 in the following circuit.



$I_1 = 4mA$

$I_2 = -6mA$

$I_3 = -2mA$

$I_4 = -10mA$

$V_x = -12V$

$I_x = -4mA$

Fig. 2.

3. (20%) Please find V_o in Fig. 3.

$V_o = \frac{-24}{7} V$

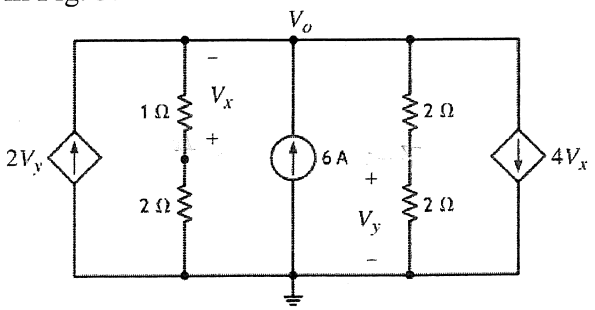


Fig. 3.

4. (20%) Using loop analysis, please find I_o in Fig. 4.

$I_o = -2.88mA$

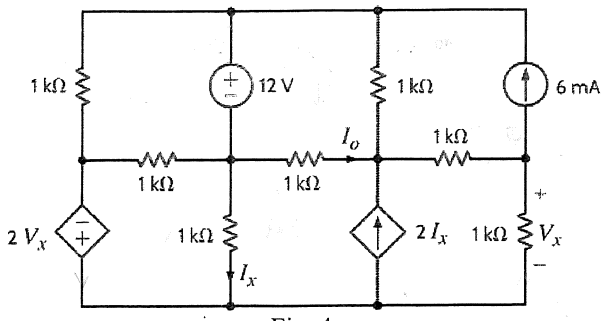


Fig. 4.

5. (15%) Please determine V_o in Fig. 5. $V_o = 10V$

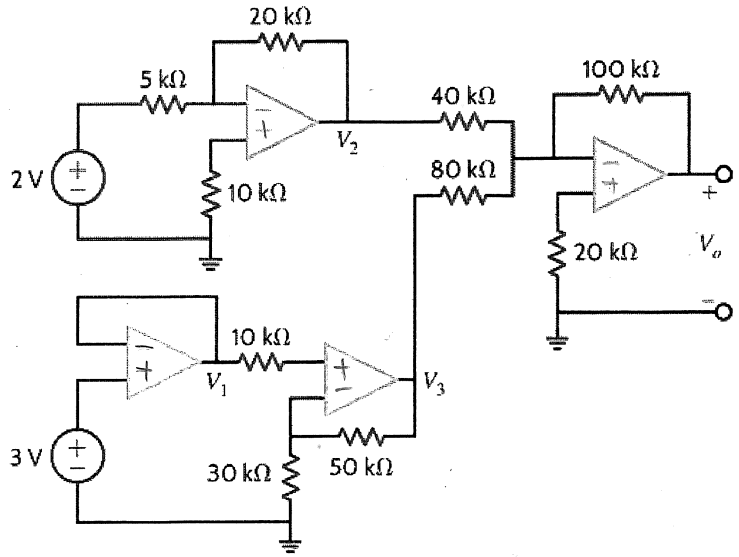


Fig. 5.

6. (20%) (a) Please find V_o in terms of V_1 and V_2 in Fig. 6. (5%) (b) If $V_1 = V_2 = 4$V, please find V_o. (5%) (c) If the op-amp power supplies are ±15V and $V_2 = 2$V, what is the allowable range of V_1 without saturation region? (10%)

(a) $V_o = -2V_1 + \frac{7}{2}V_2$

(b) $V_o = 6V$

(c) $-4V \le V_1 \le 11V$

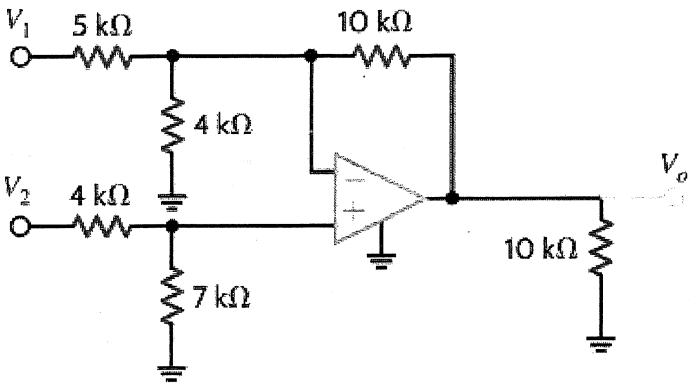


Fig. 6.