Midterm Examination

Notice: Please **turn off any types of handheld devices**, and leave them far from reach. Use only standalone calculators for calculation if it is needed. The examination takes **100 minutes**.只需繳回答案紙，題目紙請同學保留。

1. (11%) For Fig. 1, the node voltages are $v_a = 7V$ and $v_b = 10V$. Determine the values of the current source i_s, and the resistance R.
2. (11%) Determine the values of node voltages v_1, v_2, and v_3 of the circuit shown in Fig. 2.

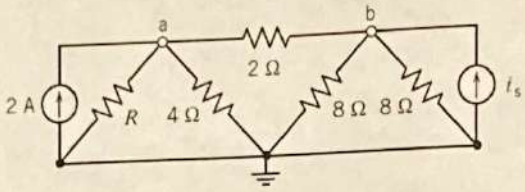

Fig. 1

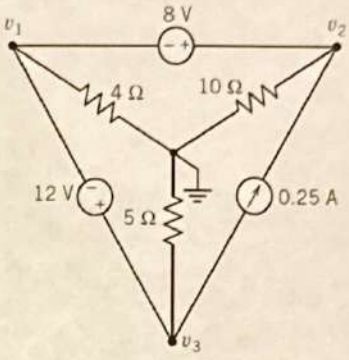

Fig. 2

3. (12%) The voltages v_1, v_2, v_3, and v_4 in Fig. 3 are the node voltages corresponding to node ①, ②, ③, and ④. Determine the values of the gains of the dependent sources, A and B, and the resistance R_1 while $v_1 = 10V$; $v_2 = 75V$; $v_3 = 15V$; and $v_4 = 22.5V$.
4. (11%) Find the current of i_1 of the circuit in Fig. 4.

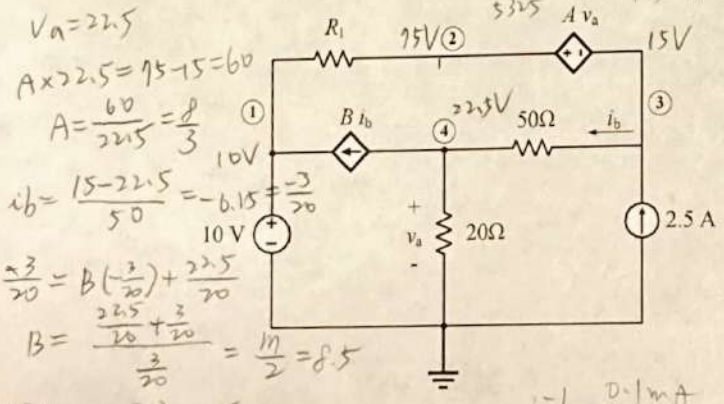

Fig. 3

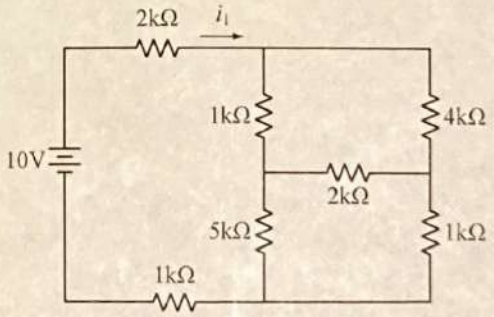

Fig. 4

5. (11%) Find the value of i_b of the circuit in Fig. 5.
6. (11%) Determine the values of node voltages v_1 and v_2 for the circuit in Fig. 6 by mesh analysis.

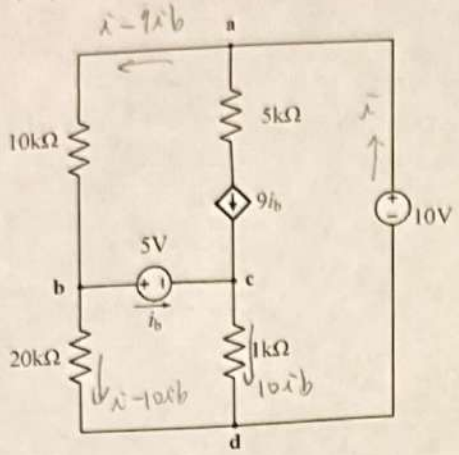

Fig. 5

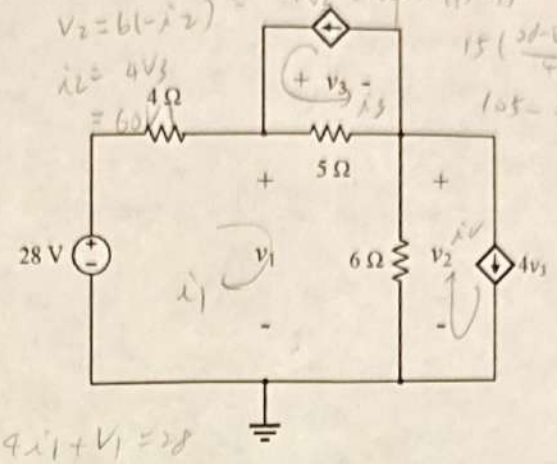

Fig. 6

7. (11%) Find the value of i_x in the circuit in Fig. 7.

8. (11%) Determine the values of the mesh currents i_1, i_2, and i_3 presented in Fig. 8 by mesh method.

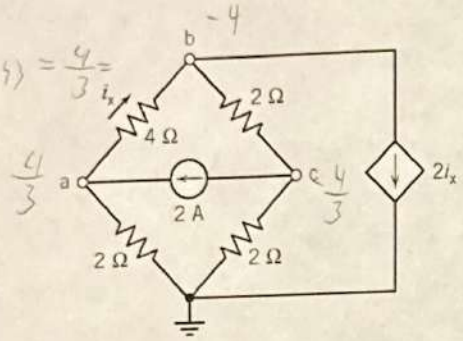

Fig. 7

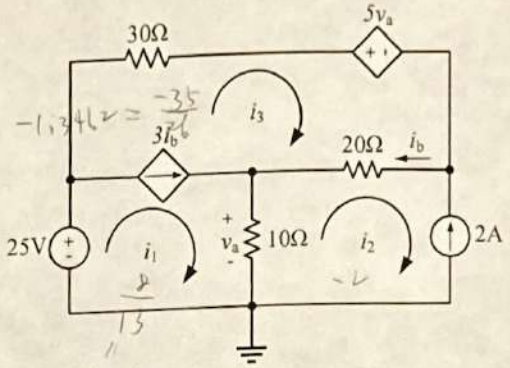

Fig. 8

9. (11%) Find v_o using source transformation if $i = 0.5$A in the circuit of Fig. 9.

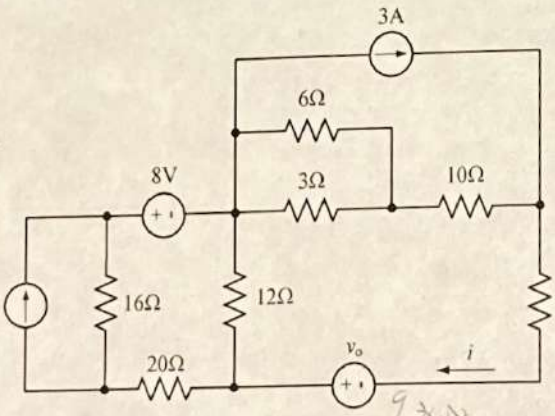

Fig. 9