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8 (10%) Given the circuit in Fig. 8, determine R_{ab} and i .

9 (12%) Use the mesh method to determine the values of i_1 , i_2 , and i_3 of the circuit in Fig. 9.

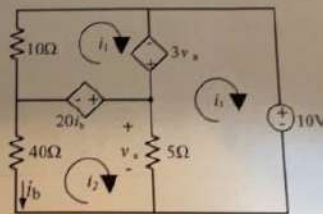


Fig. 9

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Please turn off any type of handheld device, and leave them far from reach. Use only standalone calculators for calculation if it is needed. The examination takes 90 minutes. 只需繳回答案紙，題目與請同學保留。

Midterm Examination I

1. (10%) Answer the two questions of Fig. 1 below when the input is the voltage source $v_s = 20V$. Determine the value of the resistance R that causes the value of the current $i_m = 17A$.

1.1 Suppose $R = 32\Omega$. Determine the value of the input voltage v_s that causes the value of the current $i_m = 4A$.

Fig. 1

Fig. 2

2. (10%) Determine the ratio k which makes the output current i_o in the circuit of Fig. 2 proportional to the source current i_m . $i_o = k i_m$.

3. (12%) The node voltages in the circuit shown in Fig. 3. are $v_1 = 12.5V$, $v_2 = 5V$ and $v_3 = -2.5V$. Use the nodal method to determine the values of the resistance, R_1 , and of the gain, b , of the CCCS.

Fig. 3

Fig. 4

4. (12%) The voltages v_1 , v_2 , v_3 and v_4 are the node voltages corresponding to nodes ①, ②, ③, and ④ in Fig. 4. Use the nodal method to determine the values of these node voltages.

5. (12%) Use the mesh method to determine the values of the mesh currents i_1 and i_2 for the circuit shown in Fig. 5.

Fig. 5

6. (10%) The mesh currents are labeled in the circuit shown in Fig. 6. The values of these mesh currents are: $i_1 = -1A$, $i_2 = 3A$ and $i_3 = 1A$. Determine the values of the resistances R_1 and R_2 .

Fig. 6

7. (12%) Find i_a by simplifying the circuit in Fig. 7 using source transformations to a single-loop circuit so that you need to write only one KVL equation to find i_a .

Fig. 7

Fig. 8

背面還有試題 (Next page)