1. **Equivalence** Find the Thévenin and Norton equivalents of the following circuit across the terminals $a$ and $b$ (in terms of $V_s$ and $\beta$). Note that the current source is dependent on the current $I_x$.

![Circuit Diagram](image)

2. **Kirchhoff’s Current Law and Kirchhoff’s Voltage Law**

   (a) Write Kirchhoff’s Current Law (KCL) and Kirchhoff’s Voltage Law (KVL) for the following circuit. Represent them as matrix-vector multiplications.

   (b) Write Ohm’s law for all resistors in matrix form.

   (c) The following circuit shows the arrangement of resistors with a current source connected between nodes 1 and 4. Using the values for the resistors $R_1 = R_3 = R_4 = R_5 = 1\Omega$, $R_2 = 2\Omega$, and $I = 3A$, setup a system of equations (in matrix form) to find the currents $i_1, i_2, i_3, i_4, i_5$ and voltages $v_1, v_2, v_3, v_4$. 

![Circuit Diagram](image)
(d) Solve for the currents and voltages in Figure 2 by inspection (using effective series/parallel resistors).

3. **Switch** In the following circuit, the output voltage $v_o$ is either 26 V or 24 V, depending on whether the switch is open or closed. For which state is $v_o = 24$ V? Find $R_2$ and $R_3$. 