Handwritten Assignments 6

Question 1:

For the circuits in Fig. 1, assume that the transistors have very large β. Some measurements have been made on these circuits, with the results indicated in the figure. Find the values of the other labeled voltages and currents.

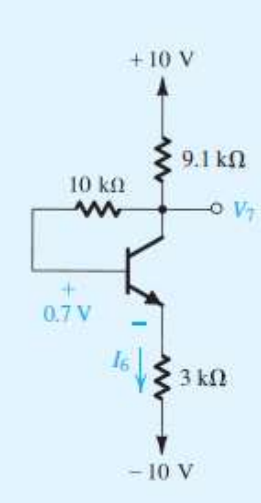

Fig. 1

Question 2:

In the circuit shown in Fig.2, current source I is 1.1 mA, and at 25°C v_{BE} = 680 mV at i_E = 1mA. At 25°C with β=100, what currents flow in $R1$ and $R2$? What voltage would you expect at node E? Noting that the temperature coefficient of v_{BE} for I_E constant is −2 mV/°C, what is the T_C of v_E? For an ambient temperature of 75°C, what voltage would you expect at node E? Clearly state any simplifying assumptions you make.

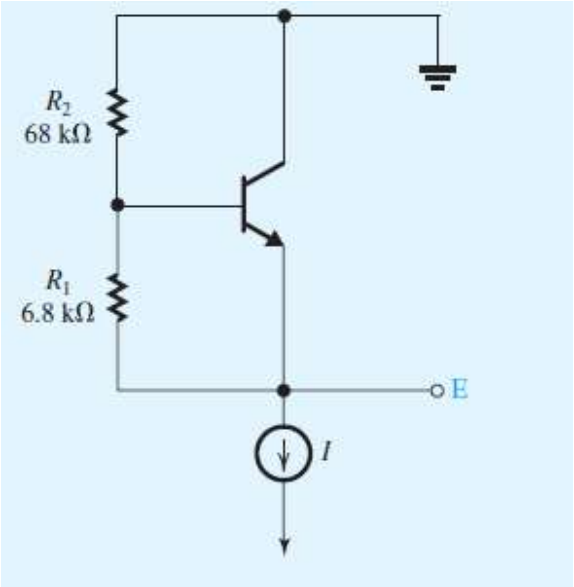

Fig. 2

Question 3:

Using $\beta=\infty$, design the circuit shown in Fig.3 so that the emitter currents of Q_1, Q_2, and Q_3 are 0.5 mA, 0.5 mA, and 1 mA, respectively, and $V_3 = 0$, $V_5 = -2$ V, and $V_7 = 1$ V. For each resistor, select the nearest standard value utilizing the table of standard values for 5% resistors in Appendix J. Now, for $\beta=100$, find the values of V_3, V_4, V_5, V_6, and V_7.

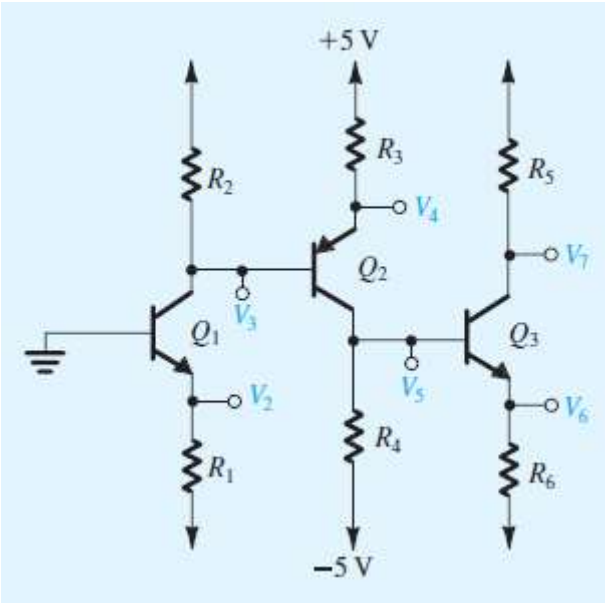

Fig. 3