ENEE233 CH4 Homework Problems

4.20 Measurements on the circuits of Fig. P4.20 produce labeled voltages as indicated. Find the value of β for each transistor.
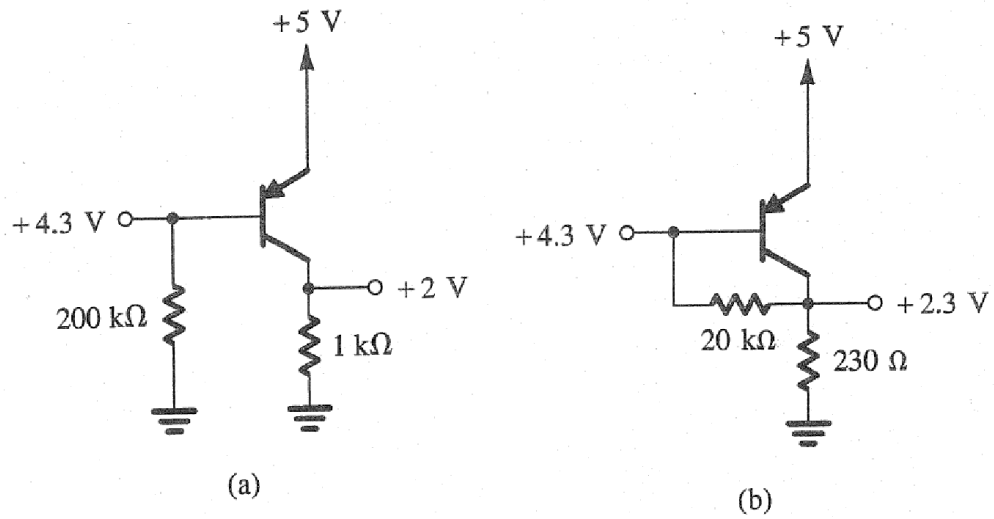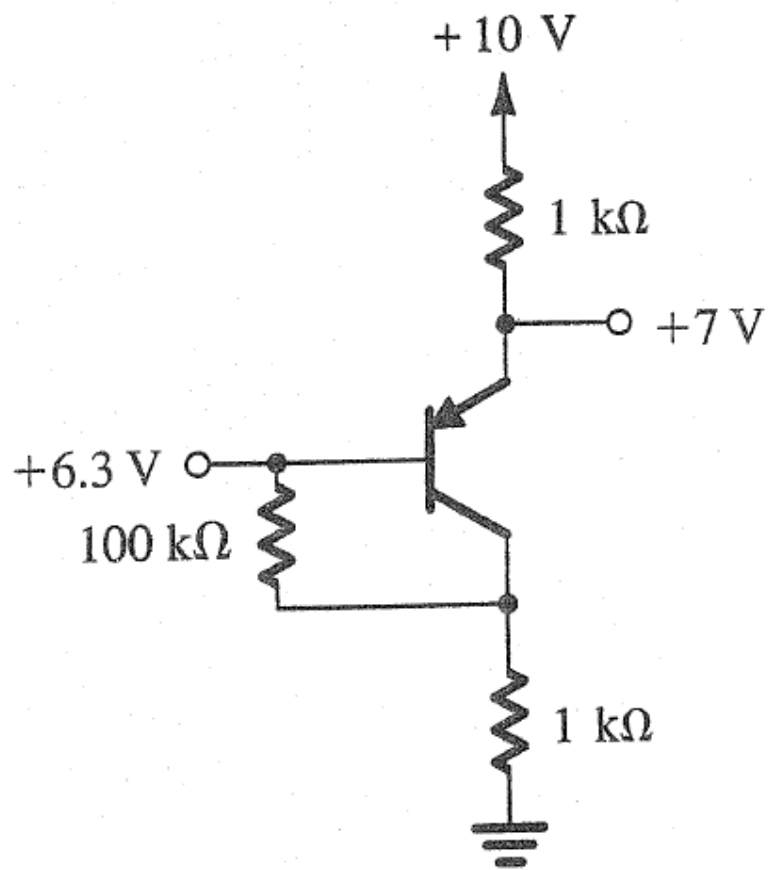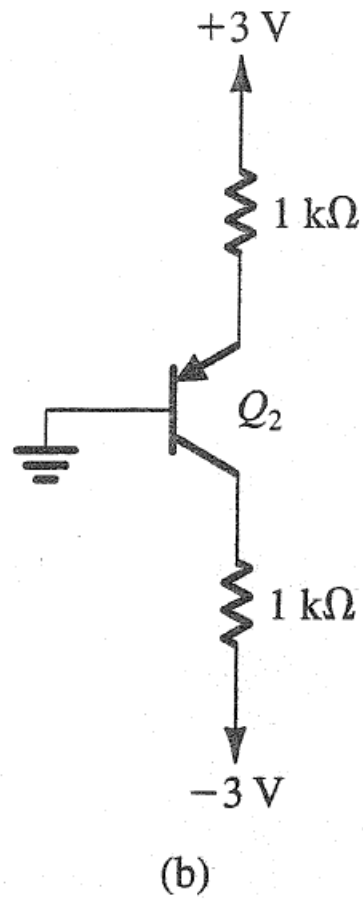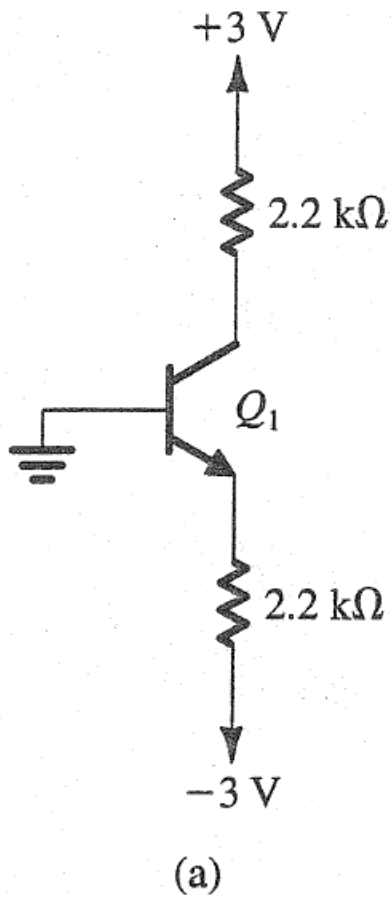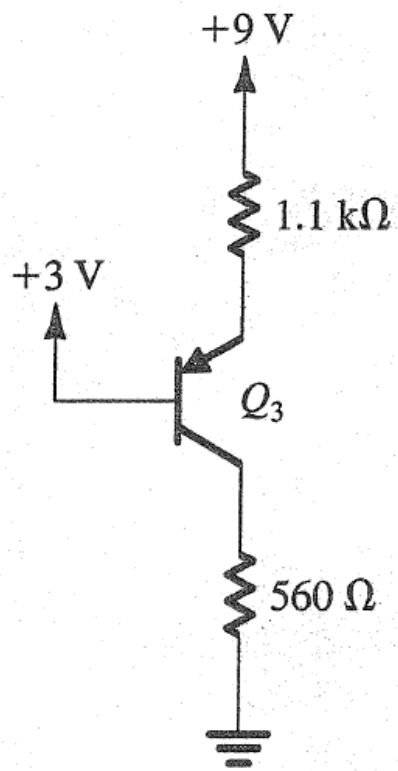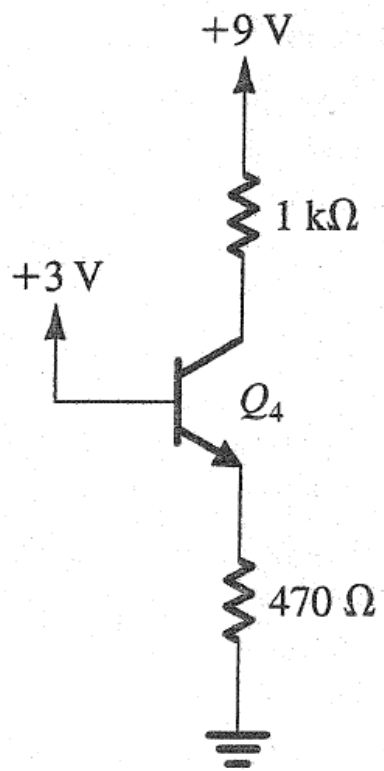

Figure P4.20

+10 V

1 kΩ

+7 V

+6.3 V

100 kΩ

1 kΩ

(c)

4.26 For each of the circuits shown in Fig. P4.26, find the emitter, base, and collector voltages and currents. Use $\beta = 30$, but assume $|V_{BE}| = 0.7$ V independent of current level.

(a)   (b)

+9 V

1.1 kΩ
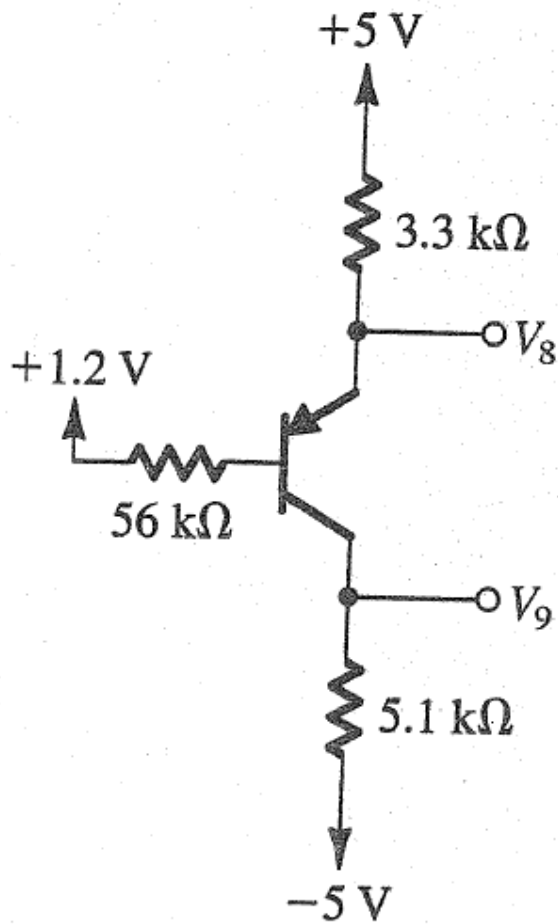
+3 V

Q_3

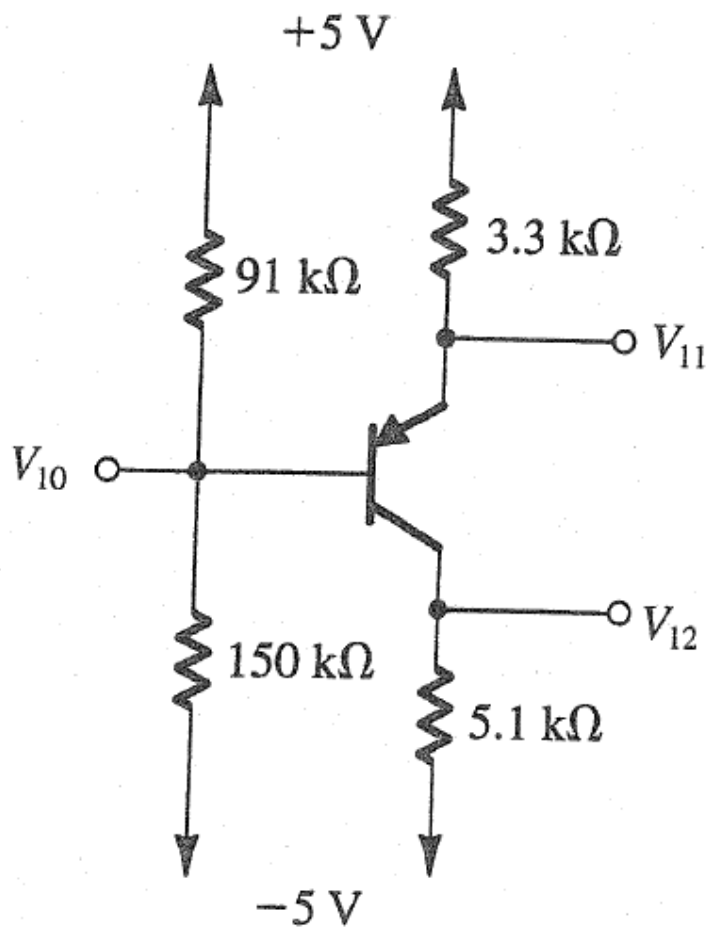560 Ω

(c)

+9 V

1 kΩ

+3 V

Q_4

470 Ω

(d)

Figure P4.26

4.46 For the circuits in Fig. P4.46, find values for the labeled node voltages and branch currents. Assume β to be very high and $|V_{BE}| = 0.7$V .

+5 V

3.3 kΩ

V_8

+1.2 V

56 kΩ

V_9

5.1 kΩ

−5 V

(d)

+5 V

91 kΩ

3.3 kΩ

V_{11}

V_{10}

150 kΩ

V_{12}

5.1 kΩ

−5 V

(e)

Figure P4.46

*4.50 For the circuit shown in Fig. P4.50, find the labeled node voltages for:
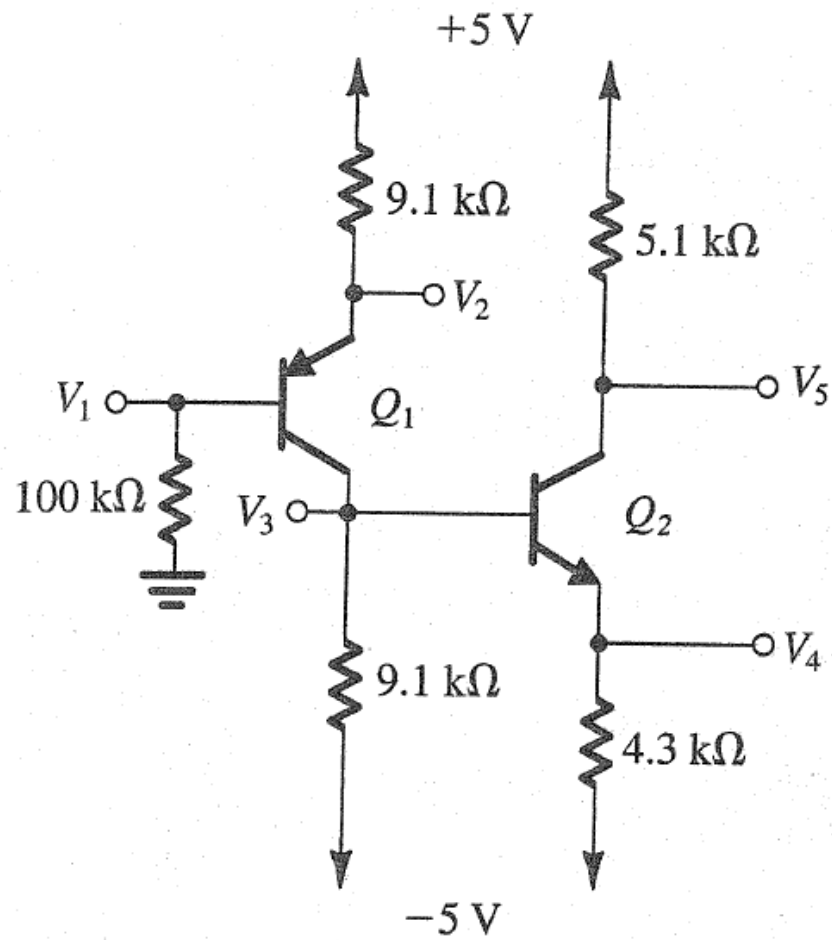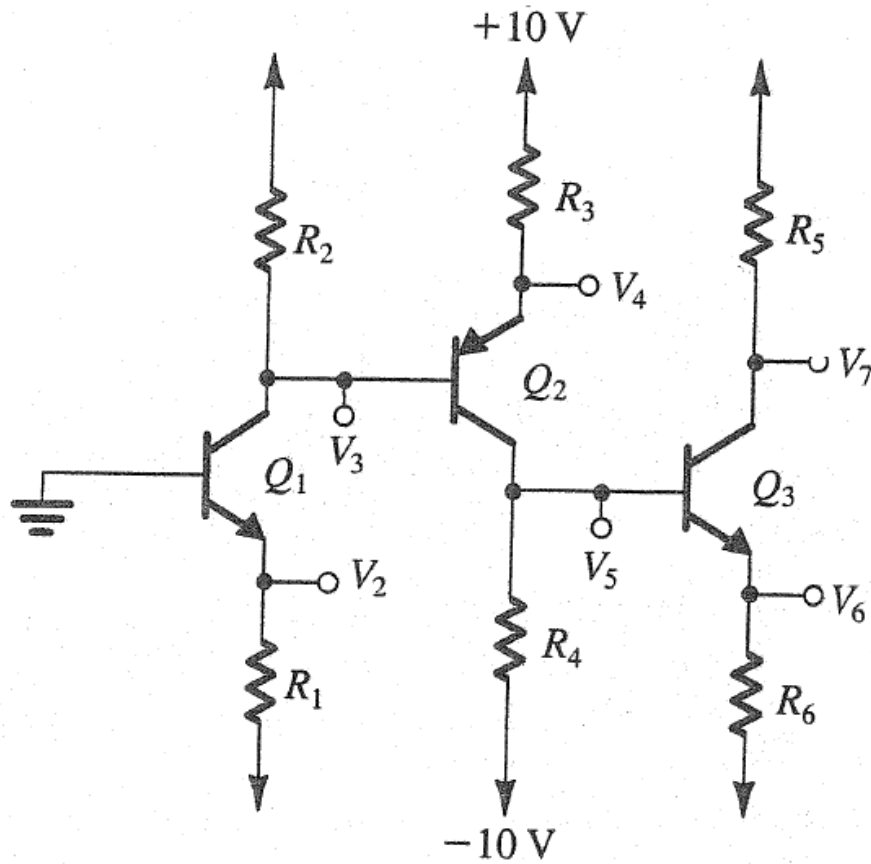
(a) $\beta = \infty$

(b) $\beta = 100$

Figure P4.50

D *4.51 Using $\beta = \infty$, design the circuit shown in Fig. P4.51 so that the bias currents in Q_1, Q_2, and Q_3 are 2 mA, 2 mA, and 4 mA, respectively, and $V_3 = 0$, $V_5 = -4$ V, and $V_7 = 2$ V. For each resistor, select the nearest standard value utilizing the table of standard values for 5% resistors in Appendix G. Now, for $\beta = 100$, find the values of V_3, V_4, V_5, V_6, and V_7.

Figure P4.51