



[1] The transistor parameters for the circuit in Figure 1 are $\beta = 180$ and $V_A = \infty$.

- (a) Find I_{CQ} and V_{CEQ} .
- (b) Calculate the small-signal voltage gain.
- (c) Determine the input and output resistances R_{ib} and R_o .

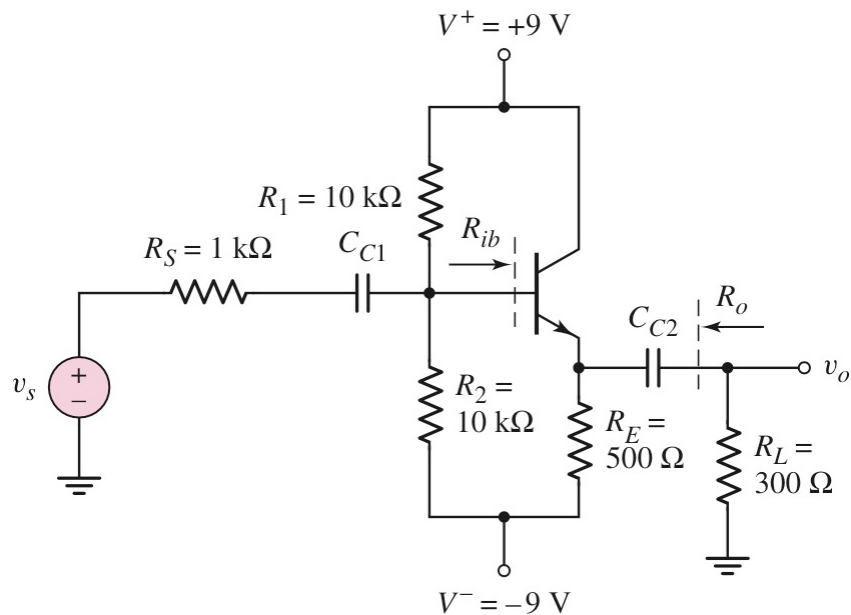


Fig. 1

[2] For the transistor in Figure 2, the parameters are $\beta = 100$ and $V_A = \infty$.

- (a) Design the circuit such that $I_{EQ} = 1$ mA and the Q-point is in the center of the dc load line.
- (b) If the peak-to-peak sinusoidal output voltage is 4 V, determine the peak-to-peak sinusoidal signals at the base of the transistor and the peak-to-peak value of v_s .
- (c) If the load resistor $R_L = 1$ kΩ is connected to the output through a coupling capacitor, determine the peak-to-peak value in the output voltage, assuming v_s is equal to the value determined in part (b).

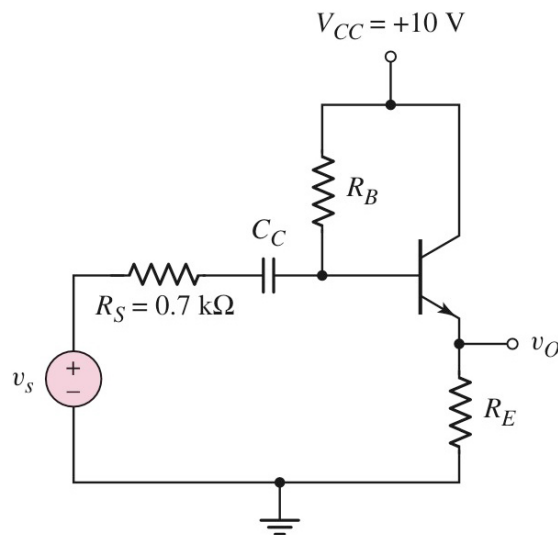


Fig. 2

[3] An emitter-follower amplifier, with the configuration shown in Figure 3, is to be designed such that an audio signal given by $v_s = 5 \sin(3000t)$ V but with a source resistance of $R_S = 10 \Omega$ can drive a small speaker. Assume the supply voltages are $V_+ = +12$ V and $V_- = -12$ V and $\beta = 50$. The load, representing the speaker, is $R_L = 12 \Omega$. The amplifier should be capable of delivering approximately 1 W of average power to the load. What is the signal power gain of your amplifier?

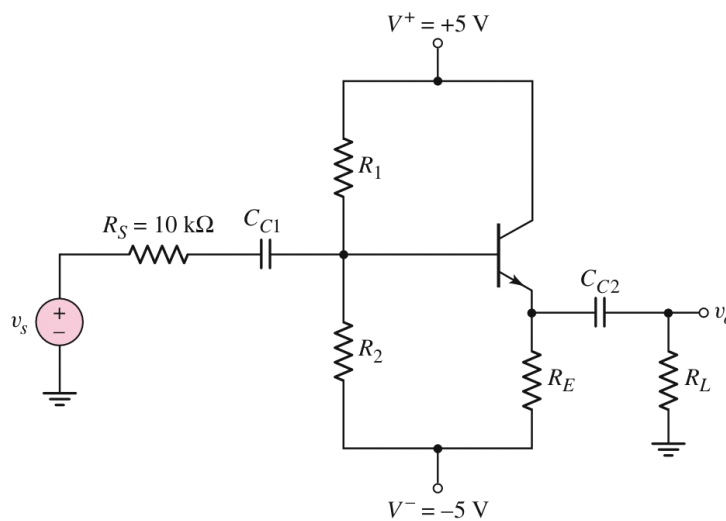


Fig. 3