



Analog Electronics

Amplifier frequency response

Tutorial 6

1. Explain why the coupling capacitors do not have a significant effect on gain at sufficiently high-signal frequencies. [4 marks]
2. What is the effect of coupling capacitors and bypass capacitor at lower frequency? [8 marks]
3. Determine the critical frequencies of each RC circuit in Figure 1. [8 marks]

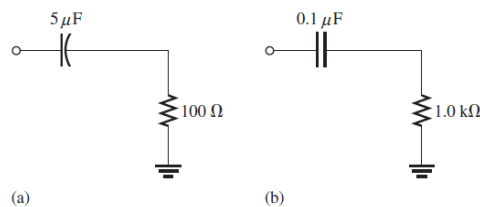


Figure 1

4. A certain amplifier exhibits an output power of 5 W with an input power of 0.5 W. What is the power gain in dB? [3 marks]
5. If the output voltage of an amplifier is 1.2 V rms and its voltage gain is 50, what is the rms input voltage? What is the gain in dB? [3 marks]
6. What are dBm values corresponding to the following power values? [8 marks]
a) 2 mW b) 1 mW c) 4 mW d) 0.25 mW
7. What is the amount of phase shift contributed by an input circuit when $X_C = 0.5 R_{in}$ at a certain frequency below f_{cl1} ? [4 marks]
8. Determine the Miller input capacitance and output capacitance for BJT amplifier in Figure 2. [15 marks]

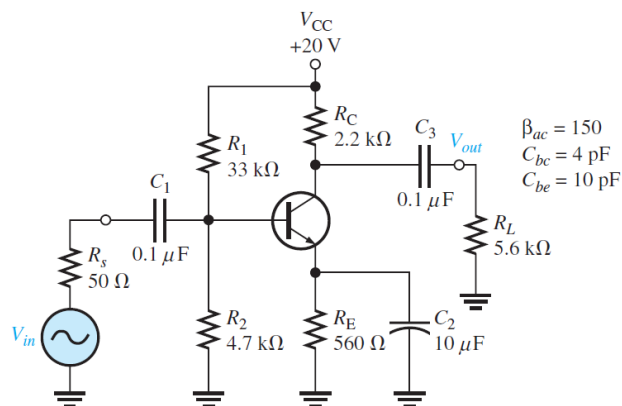


Figure 2



9. According to Figure 2, determine lower critical frequency due to input and output circuit. [10 marks]
10. Determine lower critical frequency due to input and output for FET amplifiers according the given figure below. [12 marks]

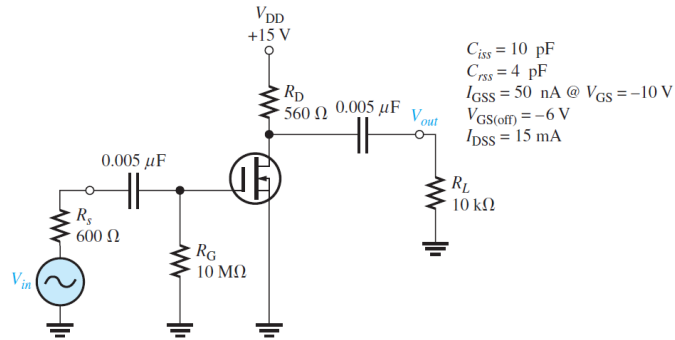


Figure 3

11. Derive the equivalent high-frequency input RC circuit for the BJT amplifier in Figure 4. Use this to determine the upper critical frequency due to the input circuit and output circuit. The transistor's datasheet provides the following: $\beta_{DC} = 125$, $C_{be} = 20$ pF, and $C_{bc} = 2.4$ pF. [25 marks]

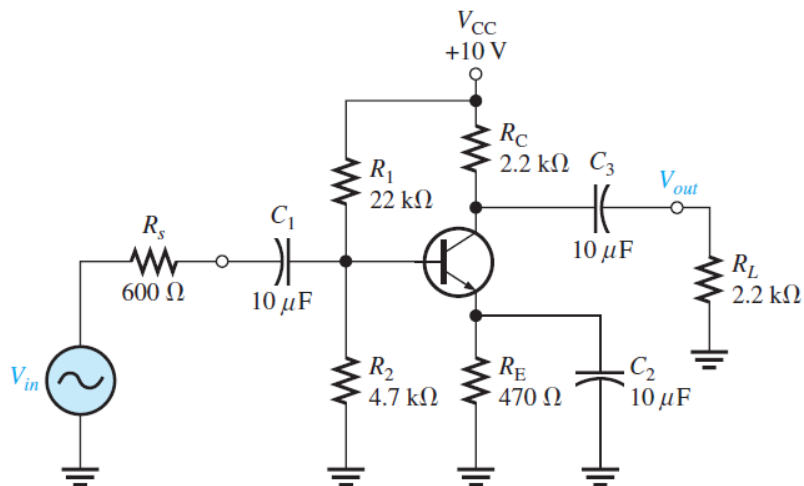


Figure 4