

Review Questions

1. Describe the motion of electrons and holes in a pnp bipolar transistor biased in the forward active mode with $V_{BC} = 0$.
2. What is the definition of the emitter efficiency? Explain in words and provide the corresponding equation.
3. What is the definition of the base transport factor? Explain in words and provide the corresponding equation.
4. Derive the relation between the current gain and the transport factor.
5. How does recombination in the quasi-neutral base region affect the emitter, base and collector current?
6. How does recombination in the base-emitter depletion region affect the emitter, base and collector current?
7. Explain the four different bias modes of a bipolar transistor.
8. Explain why a transistor can have a current gain larger than one in the common emitter mode. Provide the necessary and sufficient conditions needed to obtain a current gain larger than one.
9. What is the Early effect and how does it affect the transistor characteristics?