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Week 15 Quiz ANSWERS: Beyond the Ideal BJT
ECE 305: Semiconductor Devices
Mark Lundstrom, Purdue University, Spring 2015

Answer the **multiple choice questions** below by choosing the **one, best answer**.

1) Which of the following would reduce base-width modulation?

a) Increasing the emitter doping.
b) Increasing the base doping.
c) Increasing the collector doping.
d) Decreasing the emitter doping.
e) Decreasing the base doping.

2) Which of the following would reduce emitter current crowding?

a) Increasing the emitter doping.
b) Increasing the base doping.
c) Increasing the collector doping.
d) Decreasing the emitter doping.
e) Decreasing the base doping.

3) Which two of the following would increase the emitter injection efficiency?

a) Increasing the emitter doping.
b) Increasing the base doping.
c) Increasing the collector doping.
d) Decreasing the emitter doping.
e) Decreasing the base doping.

4) Which of the following would decrease the collector breakdown voltage?

a) Increasing the emitter doping.
b) Increasing the base doping.
c) Increasing the collector doping.
d) Decreasing the emitter doping.
e) Decreasing the base doping.

5) What is the order of highest doping, next highest doping, and lightest doping in a BJT?

a) Emitter, base, collector.
b) Emitter, collector, base.
c) Base, collector, emitter.
d) Base, emitter, collector.
e) Collector, base, emitter.

6) If a BJT is hooked up in the inverted active mode, which of the following is true as compared to the forward active mode?

a) The base transport factor is lower.
b) The base transport factor is higher.
c) The emitter injection efficiency is lower.
d) The emitter injection efficiency is higher.
e) The base transit time is longer.

7) To make a good HBT, which layer(s) should have a wide bandgap?

a) The emitter.
b) The base.
c) The emitter and the base.
d) The base and collector.
e) The collector.

8) How is the transconductance of a transistor defined?

a) The change in output current divided by the change in output voltage.
b) The change in output voltage divided by the change in output current.
c) The change in input current divided by the change in input voltage.
d) The change in input voltage divided by the change in input current.
e) The change in output current divided by the change in input voltage.