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Courses » Semiconductor Devices and Circuits

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Unit 8 - Week 7 : Bipolar Junction Transistors

Course outline

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Week 1 : Excursion in Quantum Mechanics

Week 2 : Excursion in Solid State Physics

Week 3 : Density of States, Fermi Function and Doping

Week 4 : Recombination-Generation, Charge Transport and Continuity Equation

Week 5 : Metal-Semiconductor Junctions

Week 6 : PN Junction

Week 7 : Bipolar Junction Transistors

Bipolar

Assignment 7

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2018-09-19, 23:59 IST.

1) Which of the following statements is true with regards to the BJT ? ***1 point***

- The base width must be designed to be much larger than the minority carrier diffusion length
- The base width must be designed to be much smaller than the minority carrier diffusion length
- The base region should be heavily doped
- None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
The base width must be designed to be much smaller than the minority carrier diffusion length

2) Which of the following represents the Base Transport Factor for a pnp-BJT ? ***1 point***

- $\frac{I_{pC}}{I_{pE}}$
- $\frac{I_{nC}}{I_{nE}}$
- $\frac{I_{pE}}{I_{nE}+I_{pE}}$
- $\frac{I_C}{I_E}$

No, the answer is incorrect.
Score: 0

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and Equivalent Circuit Modeling
Quiz : Assignment 7
Assignment 7: Solution
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Week 9: MOSFET: I
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Week 11: Circuits
Week 12: Thin Film Transistors (TFTs), Tutorial Sessions

- 7.5 uA
- 0.33 mA
- 17 mA
- 82 uA

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.33 mA

4) To bias a BJT in the saturation mode, Base-Emitter Junction is _____ biased and Collector-Base junction is _____ biased. ***1 point***

- reverse, reverse
- reverse, forward
- forward, reverse
- forward, forward

No, the answer is incorrect.
Score: 0

Accepted Answers:
forward, forward

5) Consider that the base transport factor in BJT is given by: $\alpha_T = \frac{1}{cosh(\frac{x_B}{L_B})}$, where x_B is the base-width and L_B is the minority carrier diffusion length in base. Find out the base-width needed in a pnp BJT to achieve a base transport factor of $\alpha_T = 0.9967$. Assume diffusion coefficient is $10cm^2/s$ and minority carrier lifetime in base is $10^{-7}s$ ***1 point***

- 0.81 um
- 2.35 um
- 0.2 um
- None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.81 um

6) In a BJT biased in the active mode, the base current is 6 μA, and the collector current is 510 μA. Find the value of α. ***1 point***

- 0.5
- 0.92
- 0.988
- 0.965

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.988

7) Which of the following in the BJT is the heavily doped region ? ***1 point***

- Emitter

- Base
- Collector
- All the regions are equally doped

No, the answer is incorrect.
Score: 0

Accepted Answers:
Emitter

8) Base-width modulation in a BJT results in: ***1 point***

- an increase in output conductance of the device
- a decrease in output conductance of the device
- no change in output conductance
- none of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
an increase in output conductance of the device

9) A BJT is generally biased in _____ mode of operation in analog amplifier circuits. ***1 point***

- saturation
- cut-off
- inverse-active
- active

No, the answer is incorrect.
Score: 0

Accepted Answers:
active

10) Early voltage represents the voltage at which: ***1 point***

- break-down occurs at the junctions.
- saturation of collector current begins.
- curves on collector-current characteristics intersect the voltage axis, when extrapolated to zero collector current value.
- none of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
curves on collector-current characteristics intersect the voltage axis, when extrapolated to zero collector current value.

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