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Courses » Fundamentals of semiconductor devices

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Unit 15 - Opto-electronic devices: Light Emitting Diodes (LED)

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Course outline

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Week 11_Assignment

The due date for submitting this assignment has passed.

As per our records you have not submitted this **Due on 2019-04-17, 23:59 IST.**
assignment.

1) LED operates under _____ with light being emitted mainly due to _____ and **1 point**
mainly requires _____

- Forward bias, band-to-band recombination, direct band gap
- Reverse bias, band-to-band recombination, direct bandgap
- Forward bias, Auger recombination, indirect bandgap
- Forward bias, S-R-H recombination, direct bandgap

No, the answer is incorrect.

Score: 0

Accepted Answers:

Forward bias, band-to-band recombination, direct band gap

2) The energy of photon emitted due to band-to-band recombination in an LED is **1 point**
_____ the bandgap energy and depends on _____ and the emission is _____.

- Greater than, effective mass of holes, monochromatic
- Lesser than, effective mass of electrons, not monochromatic
- Greater than, effective mass of holes and electrons, not monochromatic
- Greater than, effective mass of holes and electrons, not monochromatic

No, the answer is incorrect.

Score: 0

Accepted Answers:

Greater than, effective mass of holes and electrons, not monochromatic

3) There are 2 LED's. LED A is a blue LED while LED B is a red LED. Which of them have a **1 point**

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Opto-electronic devices: Solar cells and photo-detectors

Opto-electronic devices: Light Emitting Diodes (LED)

- Basics of recombination
- Basics of LED
- LED: light extraction and design issues
- Visible LED: photometry and colorimetry
- Quiz : Week 11_Assignment
- Assignmnet 11_Solutions

Applications of transistors and basics of microelectronic fabrication

ce De

No, the answer is incorrect.

Score: 0

Accepted Answers:

LED A

4) The wavelength used for fiber optic communication is _____ and the material which can ensure efficient operation for this wavelength is _____ **1 point**

- 2um, SiC
- 1.55um, InGaAs
- 2um, GaN
- 1.55 um, AlGaN

No, the answer is incorrect.

Score: 0

Accepted Answers:

1.55um, InGaAs

5) Which of these properties lead to an LED with better efficiency? **1 point**

- Radiative recombination time: 1ns and Non-radiative recombination: 100us
- Radiative recombination time: 1ns and Non-radiative recombination: 10us
- Radiative recombination time: 10ns and Non-radiative recombination: 1us
- Radiative recombination time: 10ns and Non-radiative recombination: 100ns

No, the answer is incorrect.

Score: 0

Accepted Answers:

Radiative recombination time: 1ns and Non-radiative recombination: 100us

6) The relation between WPE (Wall Plug efficiency) and EQE (External quantum efficiency) is **1 point**

- WPE > EQE
- WPE < EQE
- WPE = EQE
- There is no relation between the two.

No, the answer is incorrect.

Score: 0

Accepted Answers:

WPE < EQE

7) A GaAs LED radiates at 600 nm, with an external quantum efficiency of 20%, If $V=10$ V calculate the WPE (Wall Plug efficiency)? **2 points**

- 4 %
- 100 %
- 20 %
- 50 %

No, the answer is incorrect.

Score: 0

Accepted Answers:

4 %

8) A GaAs LED with an external quantum efficiency of 20%, If $V=10$ V and the WPE (Wall **2 points**

Plug efficiency) is 7.8 %. Calculate the wavelength at which it emits?

- 320 nm
- 820 nm
- 930 nm
- 130 nm

No, the answer is incorrect.

Score: 0

Accepted Answers:

320 nm

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