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Unit 8 - Week 6

Assessment 6

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment. **Due on 2019-03-13, 23:59 IST.**

Instructions:

1. Answer **all** questions; all questions carry equal mark.

2. All symbols have their usual meanings.

3. Only one of the options is correct

4. You can see the correct answers after the last date of submission.

Note:

Marks obtained in this quiz will be counted towards your final score. You can take the quiz and submit it any number of times, and the latest submitted answers will be taken as your final submission.

Physical Constants:

m_0= 9.11 x 10^{-31} kg; h = 6.627 x 10^{-34}J.s; e = 1.602 x 10^{-19} C; k_B = 1.38 x 10^{-23} J/K

1) One of the most efficient methods of pumping a semiconductor to provide amplification for the input light is to employ a: ***1 point***

- Forward biased p-n homojunction device
- Forward biased p-n double heterojunction device
- Forward biased p-n double homojunction device
- Forward biased p-n heterojunction device

No, the answer is incorrect.
Score: 0

Accepted Answers:
Forward biased p-n double heterojunction device

2) The intensity of a light beam doubles on passing through a particular semiconductor optical ***1 point***

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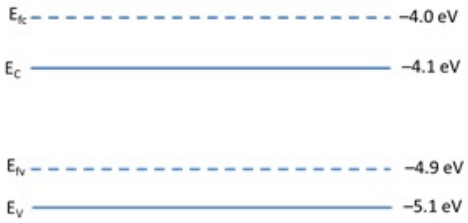
No, the answer is incorrect.
Score: 0

Accepted Answers:
138 μm

3) The energy band diagram of a particular semiconductor in quasi-equilibrium is shown below. Can this semiconductor act as a laser amplifier? If yes, determine its amplification bandwidth (BW). ***1 point***



- BW = 2.41×10^{13} Hz
- BW = 2.17×10^{14} Hz
- BW = 4.83×10^{13} Hz
- Amplification is not possible

No, the answer is incorrect.
Score: 0

Accepted Answers:
Amplification is not possible

4) During the spectral characterization of a particular semiconductor optical amplifier, the following observations were made: ***1 point***

— Light of wavelengths 1400 nm and 1450 nm are absorbed.
— Light of wavelengths 1500 nm and 1550 nm are amplified.
— Light of wavelengths 1600 nm and 1650 nm neither get amplified nor absorbed.

If amplification bandwidth of the amplifier is BW, and the bandgap of the semiconductor is E_g, then which of the following is correct?

- BW > 50 nm, E_g > 0.75 eV
- BW > 50 nm, E_g < 0.75 eV
- BW < 150 nm, E_g < 0.75 eV
- BW > 150 nm, E_g > 0.75 eV

No, the answer is incorrect.
Score: 0

Accepted Answers:
BW > 50 nm, E_g > 0.75 eV

5) A semiconductor optical amplifier (SOA) has an amplification bandwidth of 100 nm centered around the wavelength 800 nm. The corresponding amplification bandwidth in Hz is— ***1 point***

- 3.74×10^{12} Hz
- 4.68×10^{13} Hz
- 3.75×10^{14} Hz
- 2.98×10^{15} Hz

No, the answer is incorrect.
Score: 0

Accepted Answers:
$4.68x10^{13}$ Hz

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