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Unit 14 - Week 12

Assessment 12

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment. **Due on 2019-04-24, 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. The 4th and 5th questions are “fill in the blank” type of questions. You are supposed to enter a numerical answer to fill the blank as given in the question. Your answer must be correct upto two decimal places (unless it is an integer).

5. 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) Which one of the following can lead to an increase in the rise time of a photodetector? ***1 point***

- Decrease in the junction capacitance
- Increase in the responsivity
- Decrease in the load resistance
- Decrease in the mobility of carriers

No, the answer is incorrect.
Score: 0

Accepted Answers:

sub-band.

Multiple quantum wells, each supporting two electron energy sub-bands.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Multiple quantum wells, each supporting two electron energy sub-bands.

3) Which one of the following statements regarding semiconductor photodetectors is TRUE? ***1 point***

- Solar cell is a p-n diode operating in the “photoconductive mode”.
- Photoconductors do not provide current gain.
- Small-area PIN diodes are used in high-speed applications.
- APDs are used in low-noise applications.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Small-area PIN diodes are used in high-speed applications.

4) A particular PIN photodetector has a junction capacitance of 10 pF and a load resistance of 1 kΩ. The bandwidth of the detector is ___ MHz.

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 15.4,16.4

1 point

5) A PMT with 20% quantum efficiency for the photocathode has a gain of 5^7. If 10 pW of optical power at the wavelength of 1240 nm is incident on the PMT, the photocurrent through the load resistance would be ___ nA.

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 154,158.5

1 point

Previous Page End