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NPTEL

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Unit 13 - Week 11

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Week 11

General
Characteristics
of
Photodetectors

Responsivity

Assessment 11

The due date for submitting this assignment has passed.

As per our records you have not submitted this assignment. **Due on 2019-04-17, 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. Question 4 is TRUE or FALSE type of question.
5. The 5th question is a "fill in the blank" type of question. 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).
6. 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:

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

1) Which one of the following photo-detectors is of photo-emissive type? **1 point**

- PIN Diode
- APD
- Photoconductor
- PMT

No, the answer is incorrect.

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Assessment 11

Week 12

Exam
InstructionsLecture
Transcripts 12 μW 18 μW 24 μW 32 μW **No, the answer is incorrect.****Score: 0****Accepted Answers:***32 μW*

3) A particular InGaAs photodiode with an AR coating (designed for 620 nm) has a responsivity of 0.2 A/W at 620 nm. Given that the absorption coefficient of InGaAs at 1240 nm is $10^4/\text{cm}$, and the thickness of the material is 1 μm . What percentage of the generated carriers will contribute to the photocurrent in the external circuit? **0 points**

 16% 27% 53% 64%**No, the answer is incorrect.****Score: 0****Accepted Answers:***64%*

4) State whether the following statement is TRUE or FALSE:

1 point

The quantum efficiency of a photodetector increases with wavelength, reaches a maxima, and then decreases at higher wavelengths. This decrease is due to the increased absorption at the detector surface.

 TRUE FALSE**No, the answer is incorrect.****Score: 0****Accepted Answers:***FALSE*

5) A steady photon flux of 2×10^{14} photons/s is incident on a photoconductor of length 5 mm and quantum efficiency 0.1. If the excess carrier recombination time is 500 ns, and the applied bias voltage is 1 V, the photocurrent generated in the external circuit is ____ nA.

Assume that the mobilities of holes and electrons are $3000 \text{ cm}^2 \text{ V}^{-1} \text{ s}^{-1}$ each.

No, the answer is incorrect.**Score: 0****Accepted Answers:***(Type: Range) 36,40***1 point**

