Consider a silicon n+p junction solar cell with a 1 cm^2 surface area and NA = 10^15/cm^3. Calculate \( I_L \) (light current) and \( V_{oc} \) (open circuit voltage).

Assume \( D_n = 35 \text{cm}^2\text{sec}^{-1} \), \( \tau_n = 2.57 \mu\text{sec} \) and \( G_L = 2.7 \times 10^{19} \text{cm}^3\text{sec}^{-1} \), \( V_T = 25.86 \times 10^{-3} \), \( n_i = 1.5 \times 10^{10} \).

\[
I_L = 1.33 \times 10^{-10} \text{A}, \quad V_{oc} = 0.505 \text{V}
\]

No, the answer is incorrect. Score: 0

Accepted Answers:

\( I_L = 40.95 \text{mA}, \quad V_{oc} = 0.505 \text{V} \)

2) Photodiodes operate by absorption of photons or charged particles and generate a flow of \( I_L \) current in an external circuit, _______ to the incident power. The light is absorbed _______ with distance and is _______ to the absorption coefficient.

- Proportional, exponentially, proportional
- Proportional, logarithmically, inversely proportional
- Inversely proportional, exponentially, unrelated
- None of the above

No, the answer is incorrect. Score: 0

Accepted Answers:

- Proportional, exponentially, proportional
- Proportional, logarithmically, inversely proportional
- Inversely proportional, exponentially, unrelated
- None of the above
Which of the following is correct?

- All the above statements are correct.
- All the above statements are wrong.
- Only statement (2) is correct.
- Statement (1) and (2) are correct.

No, the answer is incorrect.

Score: 0

Accepted Answers:
Only statement (2) is correct

4) Consider the following statements:

1. Photodetectors are always noisier than solar cells.
2. The theoretical responsivity of UV detector is always lower than that of IF (infra-red) detectors.
   (assuming QE=1 and no gain in both the cases.)
3. Silicon can be used as detector to detect wavelength of 300nm.

Which of the following is correct?

- All the above statements are correct.
- All the above statements are wrong.
- Only statement (1) is correct.
- Only statement (2) is correct.

No, the answer is incorrect.

Score: 0

Accepted Answers:
All the above statements are correct

5) A solar cell has Voc= 0.7V. Which of the following statements is correct?

- Germanium can be used to make such a solar cell.
- It is possible to estimate the fill factor of the solar cell without knowing any other parameter.
- Short circuit current of the solar cell can be estimated from this information.
- All the above statements are incorrect.

No, the answer is incorrect.

Score: 0

Accepted Answers:
It is possible to estimate the fill factor of the solar cell without knowing any other parameter

6) A solar cell is illuminated uniformly by monochromatic light of wavelength 500nm and intensity 25mW/cm². What is the upper limit to short circuit current output of the cell if its bandgap is 1.5eV?

- 10mA/cm²
- 100mA/cm²
- 50mA/cm²
- 5mA/cm²

No, the answer is incorrect.

Score: 0

Accepted Answers:
10mA/cm²
7) Why are photodetectors inherently noisier than solar cells?

- Load Resistance in photodetector is much lower than in solar cell resulting in lower equivalent circuit resistance.
- Thermal noise in Photodetector varies inversely as the resistance, leading to more noise in detectors.
- Noise is higher for Higher Bandwidth.
- All the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
All the above

8) A photodetector can have 100% efficiency. Choose the correct statement.

- Photodetector detects photons of particular wavelength only.
- Detectors are reverse-biased during operation and this can lead to internal gain.
- Both Statement (a) and (b) are correct
- Both statement (a) and (b) are incorrect.

No, the answer is incorrect.
Score: 0
Accepted Answers:
Both Statement (a) and (b) are correct