Assignment-12

The due date for submitting this assignment has passed.

Due on 2021-04-14, 23:59 IST.

Q(1) is of multi-correct type with no partial marking

1) Under dark condition, bias direction (forward or reverse) in P-N junction diode
   - Changes diffusion, drift and generation current
   - Changes only diffusion current
   - Changes only drift current
   - Changes only generation current

   No, the answer is incorrect.
   Score: 0
   Accepted Answers:
   Changes only diffusion current

2) Carrier injection happens
   - Under forward bias for majority carriers only
   - Under reverse bias for majority carriers only
   - Under forward bias for minority carriers only
   - Under reverse bias for minority carriers only

   No, the answer is incorrect.
   Score: 0
   Accepted Answers:
   Under forward bias for minority carriers only

3) Find out the dark current density (in mA/cm²) in a P-N junction on Si substrate at room temperature (300 K) where the acceptor dopant concentration and donor dopant concentration are 5x10²⁰ atoms/cm³ and 1x10²⁰ atoms/cm³, respectively. Given: Dn = 3x10²⁰ m⁻², Do = 10 cm²/μs, Lp = 40 μm, Lj = 100 μm.

   Answer format: - If 2₁²⁽⁻¹⁾ then write: .0002 in answer column.

   No, the answer is incorrect.
   Score: 0
   Accepted Answers:
   (Type: Range) .0000008, 00000006

4) Find the short-circuit current density (in A/cm²) for a P-N junction solar cell if the rate of generation is 1.5x10²⁴ atoms/cm²s. The electron and hole diffusion lengths are 80 μm and 15 μm, respectively. It can be assumed that the rate of generation is uniform throughout the volume and the depletion region is negligibly small compared to the diffusion lengths.

   No, the answer is incorrect.
   Score: 0
   Accepted Answers:
   (Type: Range) 35.5,37.5

5) Mark the correct statement(s)
   - Maximum power point corresponds to maximum voltage point for a P-N junction diode
   - Higher the fill factor, better the efficiency of a solar cell
   - Open circuit voltage of a solar cell is independent of temperature
   - Higher irradiance always ensures higher efficiency of a solar cell at constant temperature

   No, the answer is incorrect.
   Score: 0
   Accepted Answers:
   Higher the fill factor, better the efficiency of a solar cell

6) With increasing temperature of a solar cell
   - JSC decreases
   - VOC decreases
   - JSC remains constant
   - VOC remains constant

   No, the answer is incorrect.
   Score: 0
   Accepted Answers:
   VOC increases

7) At a given temperature, with increasing irradiance on a solar cell
   - JSC decreases
   - VOC increases
   - JSC increases
   - VOC remains the same

   No, the answer is incorrect.
   Score: 0
   Accepted Answers:
   VOC increases
   JSC increases