

COURSE: U14EI 205 - BASIC ELECTRONICS ENGINEERING	ECE-I, Semester-II
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ASSIGNMENT-2

Topic	Assignment Posted On	Submission Due On
P-N Junction Diode	06.01.2016	12.02.2016

- 1 Show that the Fermi level is at the center of forbidden gap in an intrinsic semiconductor. State what happens to the Fermi level of N-type and P-type semiconductors by referring to expressions concerned.
- 2 Explain Drift and diffusion currents with reference to a semiconductor.
- 3 Explain how the depletion region is formed at a pn-junction.
- 4 Explain the operation of the p-n diode in forward and reverse bias modes. Also plot the V-I characteristic curve for Si and Ge diodes.
- 5 What is reverse saturation current (I_o)? Mention approximate order of I_o for Ge and Si diodes. Discuss the effect of temperature on I_o by writing necessary expression.
- 6 Explain breakdown mechanisms that occur in a p-n junction diode.
- 7 How many types of capacitances are associated with pn-junction? Explain which type of capacitance is important for forward and reverse bias modes of operation.
- 8 Explain the phenomenon of Hall Effect. Mention its applications.
- 9 For what value of voltage will the reverse current (I_o) in a p-n junction Ge diode reach 90% of its saturation value at room temperature?
- 10 A Si diode operates at a forward voltage of 0.6V. Calculate the factor by which the current will be multiplied when the temperature changes from $25^\circ C$ to $150^\circ C$.

Instructions:

1. Submit the solutions during the lunch break on or before due date @ **Room No: B-I-208**
2. **Write the questions and answer/solve them legibly and neatly**
3. **Make an honest effort to solve the assignment problems.** In case of difficulty, discuss with friends/ Teacher and refer to solutions as a last resort. **Finally, rework the solutions on your own for submission**
4. *Students will be graded on the quality of their work*

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