

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION)**

**CLASS: B.TECH
BRANCH: ECE**

**SEMESTER: III
SESSION : MO/2019**

SUBJECT : EC201 ELECTRONIC DEVICES

TIME: 2 HOURS

FULL MARKS: 25

INSTRUCTIONS:

1. The total marks of the questions are 25.
 2. Candidates may attempt for all 25 marks.
 3. Before attempting the question paper, be sure that you have got the correct question paper.
 4. The missing data, if any, may be assumed suitably.
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- Q1 (a) Describe effective mass of an electron with suitable analogy. [2]
(b) Determine the probability that an energy level $3kT$ above the Fermi energy is occupied by an electron at $T = 300$ K. [3]
- Q2 (a) Explain temperature dependence of intrinsic carrier concentration n_i . [2]
(b) The value of n_i at any temperature is a definite number for a given semiconductor. Illustrate the statement with suitable diagram/equation. [3]
- Q3 (a) Explain why diffusion current occurs in semiconductor. Explain with suitable diagram and hole diffusion current equation. [2]
(b) Explain how a pulse of excess electrons injected at $x = 0$ at time $t = 0$ will spread out in time. Substantiate your answer with suitable diagram. [3]
- Q4 (a) Define luminescence. Which semiconductors exhibit luminescence? [2]
(b) Optical absorption is used to measure band gap energy (E_G) of a semiconductor. Explain how this is possible. [3]
- Q5 (a) Write expression of contact potential and explain each term in it. [2]
(b) Write brief technical note on Zener breakdown. [3]

:25/09/2019 :