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Code No.: 12003 AS-03

**VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD**  
**B.E. I Year II-Semester Advanced Supplementary Examinations, June/July-2017**

**Engineering Physics-II**  
**(C.S.E., E.C.E. & I.T.)**

Time: 3 hours

Max. Marks: 50

*Note: Answer ALL questions in Part-A and any FIVE from Part-B*

**Part-A (15 Marks)**

1. State Bragg's law with neat diagram. [1]
2. What are Cooper pairs? [1]
3. Define the term Drift current. [1]
4. What are Inertial and non-inertial frame of references? [1]
5. Mention any three process by which Nano materials are synthesized. [1]
6. Define Schottky and Frenkel defects with neat diagram. [2]
7. Mention any four applications of Hall Effect. [2]
8. The electron and hole motilities in a Si sample are  $0.135$  and  $0.048 \text{ m}^2 \text{ V}^{-1}\text{S}^{-1}$  respectively. Determine the conductivity of intrinsic Si at 300K if intrinsic Carrier Concentration is  $1.5 \times 10^{16} \text{ atoms/m}^3$ . [2]
9. State the fundamental postulates of Special Theory of Relativity. [2]
10. Give any four applications of carbon nanotubes. [2]

**Part-B (5 × 7 = 35 Marks)**

11. a) Derive Schrodinger's time – independent wave equation. [4]  
b) What are Miller Indices? Explain with an example. [3]
12. a) Derive an expression for number of electrons per unit volume in the conduction band of an intrinsic semiconductor. [4]  
b) Classify different types of solids based on band theory. [3]
13. a) Derive continuity equation for an electron in a semiconductor. [4]  
b) What are the advantages of LED? [3]
14. a) Using postulates of special theory of relativity obtain Lorentz Transformation equations for space and time. [4]  
b) A rod of 1 meter long is moving along its length with a velocity  $0.6c$ . Calculate its length as it appears to an observer i) on the earth ii) moving with the rod itself. [3]
15. a) How electrical, mechanical and optical properties of nano materials vary with size. [4]  
b) Explain how nano materials are synthesized by Chemical Vapour Deposition. [3]
16. a) Describe the powder method of determination of crystal structure with neat diagram. [4]  
b) What is meant by Meissner Effect and explain how it contradicts Maxwell theory? [3]
17. Write short notes on any two of the following: [7]
  - a) Working of Solar Cell.
  - b) Addition of relativistic velocities.
  - c) Surface to volume ratio and quantum confinement.

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