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Question Paper Code : 60055

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2022.

Second Semester

Electronics and Communication Engineering

PH3254 – PHYSICS FOR ELECTRONICS ENGINEERING

(Common to: Electronics and Telecommunication Engineering)

(Regulations 2021)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. For a cubic system, sketch the planes with Miller Indices (110) and (011).
2. Define the terms linear and planar densities.
3. List out the three main theories developed for understanding the properties of metals.
4. On the basis of spin how are the materials classified?
5. State the properties of a semiconductor.
6. Give any two differences between Schottky diode and Ohmic contacts.
7. What are the main requirements for a suitable LED material?
8. Define the term plasmonics.
9. What is a quantum structure?
10. What is spintronics? Give its applications.

PART B — (5 × 16 = 80 marks)

11. (a) Describe the seven systems of crystals with suitable diagrams and give the relation of lengths of axes and the relation between the axes of a unit cell in each type.

Or

- (b) Classify and explain the various types of crystal defects with neat diagram.

12. (a) Write a short note on Tight Binding Approximation for energy band in solids. Derive the expression for effective mass of an electron and give the concept of hole.

Or

- (b) Discuss about the origin of ferromagnetism and exchange interaction in ferromagnetic materials.

13. (a) (i) Derive an expression for concentration of electrons in an n-type semiconductor. (12)
(ii) Briefly describe the variation of carrier concentration with temperature. (4)

Or

- (b) What is Hall Effect? Derive an expression of Hall Coefficient R_H for n-type semiconductor. Give the experimental determination of Hall Effect. Write its applications and importance.

14. (a) Discuss about the optical processes in semiconductors and in quantum well.

Or

- (b) Explain the construction and working of optoelectronic device made up of many layers with organic molecules of different conductivity levels.

15. (a) Explain the density of states in quantum well, quantum wire and quantum dot structure.

Or

- (b) Describe the CNT structures in detail with illustrations. Mention the physical properties and applications of CNT.