26.4.19

Roll No. | | | | | | | | | | |

B.E / B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, APRIL / MAY 2019

COMMON TO ECE AND IT BRANCHES

Second Semester **(CBCS Regulation : 2015)**

PH7255 - PHYSICS FOR ELECTRONICS AND INFORMATION SCIENCE

Time: 3 Hours | Answer ALL Questions | Max. Marks : 100

PART-A (10 x 2 = 20 Marks)

1. What is meant by Quantum mechanical tunneling?
2. What do you understand from the effective mass of electron?
3. Distinguish between intrinsic and extrinsic semiconductors.
4. What is Ohmic contact? Give its significance.
5. How magnetic materials are classified?
6. Clearly mention any two differences between hard and soft magnetic materials.
7. Write any two merits and demerits of OLED over conventional LED.
8. List out any two advantages of Blu-ray disk over DVD.
9. What is meant by Quantum confinement?
10. State the variation in the density of states between a 3D and Quantum dot structures.

Part – B (5 x 16 = 80 marks)

11. a (i) Describe in detail the method of construction and working of LCD display system.
(ii) Explain with a neat diagram the method of holographic data storage technique. (8+8

12. a (i) On the basis of Classical free theory of metals, derive an expression for electrical and thermal conductivity of a metal and hence deduce the expression for Wiedemann-Franz law.
(ii) Calculate the lowest three permissible quantum energies that an electron can have when it is confined to a cubical box of side 0.1nm. (12+4

(OR)

b (i) Derive an expression for density of energy states in a metal and hence deduce the expression for the electron density in a metal at 0K.
(ii) Calculate the probability for an electron to be occupied, if the energy state lie 0.12eV above and below the Fermi energy level at 27°C. (12+4

13. a (i) Derive an expression for the density of electrons and holes in an intrinsic semiconductor.
(ii)For an intrinsic semiconductor with a band gap of 1.1eV, calculate the concentration of intrinsic charge carrier density at 300K by assuming the effective mass of the electron and hole is equal to the rest mass of the electron. (12+4

(OR)

b. (i) Give the theory of Hall effect. Describe the Hall effect experiment to determine the Hall -coefficient of a semiconductor.
(ii) In an n-type semiconductor, at 300K the Fermi level lies 0.4eV below the conduction band. If the concentrations of donor atoms are doubled, find the new position of the Fermi level at 300K. (12+4

14. a. (i) What are the properties of Ferromagnetic materials? Explain the hysteresis (M-H behavior) curve on the basis of domain theory.
(ii) A magnetic material has a magnetization of 3500A/m and flux density of 0.145Wb/m^2. Calculate the magnetizing force and relative permeability of the material. (12+4

(OR)

b. (i) What is GMR? Give its significance. Explain in detail, the method how data are stored and read out in the magnetic hard disk.
(ii) The saturation magnetization of Nickel is 0.65 Wb/m^2. If the density of Nickel is 8900 Kg/m^3 and the atomic weight is 58.7. Calculate the magnetic moment of a Nickel atom in Bohr magneton. (12+4

15. a. What is Coulomb blockade effect? With neat diagram, explain the principle and working of single electron transistor. (16

(OR)

b. What are the properties of Carbon nanotubes? How are they classified? Give some applications of Carbon nanotubes. (16

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