Reg. No. : | | | | | | | | | | |

Question Paper Code: 51205

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2016

Second Semester

Computer Science Engineering

15UPH205 - SEMICONDUCTOR PHYSICS AND OPTO ELECTRONICS

(Common to ECE and IT branches)

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Which one is a Fermion?

   (a) Photon (b) Phonon (c) Boson (d) Electron

2. In a conducting material when the temperature increases resistivity

   (a) Increases (b) Decreases (c) Constant (d) None of these

3. Which one is elemental semiconductor?

   (a) Ge (b) Si (c) Both a and b (d) None of these

4. Residual Magnetism exists due to

   (a) Impurities (b) Imperfections (c) Dislocations (d) all the above

5. Orientational polarization depends on

   (a)) Temperature (b) Frequency (c) Both a and b (d) None of these

6. Which one act as a super conducting material?

   (a) Dia (b) Para (c) Ferro (d) Ferri

7. Which coolant is efficient during the super conductivity studies?

(a) Liquid helium (b) Liquid Nitrogen
(c) Both a and b (d) None of these

8. In a PIN diode which region absorbs more light?

(a) P-region (b) N-region
(c) Depletion region (d) none of these

9. Light get attenuated in optical fibre due to

(a) Scattering (b) Microbending
(c) Impurities (d) all the above

10. Opitcal fibre is a

(a) Dielectric (b) Conducting
(c) Insulating (d) none of these

PART - B (5 x 2 = 10 Marks)

11. List out the drawbacks of classical free electron theory.

12. Give the expression and value of one Bohr magneton.

13. Define superconductivity and give example.

14. What is pulse code modulation?

15. Write the conditions to make a total internal reflection in a optical fibre.

PART - C (5 x 16 = 80 Marks)

16. (a) Derive an expression for electrical conductivity, thermal conductivity and Lorentz number. (16)

Or

(b) (i) What is a fermi function and explain effect of temperature on fermi function. (6)

(ii) Derive an expression for density of states. (10)

17. (a) What is Hall effect? Derive an expression for Hall coefficient and Hall voltage. (16)

Or

(b) (i) Distinguish between soft and hard magnetic materials. (6)

(ii) Explain the hysteresis behavior in Ferromagnetism based on domain concepts.(10)

18. (a) Explain the various types of polarization mechanisms in dielectrics with relevant expressions. (16)

Or

(b) Explain the preparation, structure, properties and applications of high temperature superconductors. (16)

19. (a) What is meant by electro absorption? Explain the working of Franz Keldysh electro absorption modulators. (16)

Or

(b) What is meant by optical switching? Explain the working of self electro optic device. (16)

20. (a) Drive an expression for critical angle, acceptance angle, numerical aperture, fractional index change and relationship between them in a optical fibre. (16)

Or

(b) (i) Explain the optical fibre communication system with block diagram. (8)

(ii) List out the advantages of optical fibre over copper cables. (8)

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