ANNA UNIVERSITY OF TECHNOLOGY, COIMBATORE

B.E. / B.TECH. DEGREE EXAMINATIONS : NOV / DEC 2011

REGULATIONS : 2008

SECOND SEMESTER

080040002 - ENGINEERING PHYSICS II

(COMMON TO ALL BRANCHES)

Time : 3 Hours   Max.Marks : 100

PART - A

(10 x 2 = 20 Marks)

ANSWER ALL QUESTIONS

1) Define Wiedemann franz law.

2) Define drift velocity of an electron

3) Define Meissner effect.

4) State the properties of semiconductors.

5) What is meant by energy band gap?

6) What are ferrites?

7) What is meant by dielectric breakdown?

8) What is meant by a ferroelectric material?

9) Give the structures of Carbon Nano Tubes.

10) Give any two applications of metallic glasses

PART - B

(5 x 16 = 80 Marks)

ANSWER ALL QUESTIONS

11a.i) Discuss the postulates of classical free electron theory and derive an expression for electrical conductivity of a conducting material. (12)

ii) Calculate the relaxation time if the resistivity of the material is 1.69×10^{-8} ohm-m and density of free electron is $8.5 \times 10^{28}/ m^3$. (4)

(OR)

11b. What is density of energy states and derive an expression for the same and also deduce Fermi energy at 0K.

12 a) Derive the expression for the carrier concentration of n-type semiconductor and also explain the variation of the same with temperature.

(OR)

12b. (i) State Hall Effect and derive the expression for Hall voltage and Hall coefficient. (12)

(ii) A semi conducting crystal 12mm long, 5mm wide and 1mm thick has a magnetic flux density of $0.5 Wb/m^2$ applied from front to back perpendicular to largest faces. When a current of 20mA flows lengthwise through the specimen, the voltage measured across its width is found to be 37 V. What is the Hall coefficient of this semi conductor? (4)

13a.i) Explain the effect of current and magnetic field on superconductors. (6)

ii) Explain type I and type II superconductors with examples. (6)

iii) Explain the applications of superconductor as a cryotron. (4)

(OR)

13b i) Give the domain theory of ferromagnetism and also explain its hysteresis curve on the basis of domain theory. (12)

ii) Explain the differences between soft and hard magnetic materials. (4)

14a. Discuss the various types of polarization in a dielectric materials.

(OR)

14b. What is meant by local field in dielectrics and how it is calculated for a cubic structure and also deduce Claussius-Mosotti relation.

15a. Explain the theory of shape memory alloy and give the properties and applications of the same.

(OR)

15b. (i) Explain with neat sketch, how the nano particles are prepared using ball milling technique. (10)

(ii) Explain the properties and applications of carbon nano tubes. (6)

*****THE END*****