NAME_____ ROLLNO_____

2006–ANNA UNIVERSITY

B.E/B.TECH DEGREE EXAMINATION

PHYSICS-II

(EEE, EIE, ICE)

DECE-2006

TIME-3 HOUR

MARKS-100

ANSWER ALL QUESTIONS.

PART A - (10 * 2 = 20 MARKS)

1) What is Fermi energy?

2) State Widemann-Franz law.

3) The superconducting transition temperature of lead is 7.26K. The initial field at 0K is 64 X 103 amp./m. Calculate the critical field at 5K.

4) What is Meissner effect in superconductor?

5) What are the essential difference between hard and soft magnetic materials?

6) What are ferites?

7) Calculate the wavelength of emission fom Ga-As whose bandgap is 1.44eV. h=6.626 X 10-34 J.S. C=3X108 m/sec.

8) What are the advantages of liquid crystal displays?

9) What are shape memory alloys?

10) What are nanophase materials?

PART B - (5 * 16 = 80 MARKS)

11) (i) What are non linear maeterials?

(ii) Describe a technique to synthesize nanophase materials.

(iii) Discuss their applications in various fields.

12) (a) (i) What are the special features of classical free electron theory of metals?

(ii) Derive an expression for the electrical conductivity of a metal.

(iii) How is it affected by temperature and alloying?

OR

(b) (i) Obtain a general expression for the Fermi energy of electrons in solids at zero Kelvin.

(ii) Show that at the same temperature, the average energy of the electron is (3/5)th of the Fermi energy.

(iii) Copper has electrical conductivity of copper. Lorentz No. L = 2.45 X 10-8.

13) (a) (i) What are the differences between elemental and compound semiconductors?

(ii) Get an expression for the carrier concentration of an intrinsic semiconductor.

(iii) Mention the variation of Fermi energy with temperature in an intrinsic semiconductor.

OR

(b) (i) What is SQUID?

(ii) Explain BCS theory with a special note of cooper pairs.

(iii) Give any four medical applications of superconductor.

14) (a) (i) What is Bohr magnetron?

(ii) Discuss the effect of domains when they are subjected to external magnetic field.

(iii) What are the four types of energies involved in the growth of magnetic domains?

OR

(b) (i) What are anti-ferromagnetic materials?

(ii) How they differ from dia-magnetic materials.

(iii) What are the advantages and disadvantages of a magnetic disc.

15) (a) What is meant by local field in a dielectric and how is it calculated for a cubic structure? Deduce the Clausius Mosotti relation.

OR

(b) Discuss in detail the various dielectric breakdown mechanisms. Write a note on ferroelectric materials and their properties.