C 48111 (Pages : 2) Name.....

Reg. No.....

FOURTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION—JUNE 2008

EE 2K 406—ELECTRICAL ENGINEERING MATERIAL SCIENCE

Time : Three Hours Maximum : 100 Marks

I. (a) Explain the creation of dipoles in a magnetic materials.

(b) Discuss the process of Polarization in solid dielectrics.

(c) Write a note on the main features of ferroelectricity.

(d) Classify and briefly explain the insulating materials according to temperature variation.

(e) Discuss some of the special properties and applications of gaseous insulators.

(f) Write a short note on photothermal conversion.

(g) Give some of the modern techniques used for material studies.

(h) Write a short note on Ferromagnetic resonance.

(8 × 5 = 40 marks)

II. (a) (i) Differentiate the Ferro, Antireflection and Ferromagnetic materials. (5 marks)

(ii) Explain the term "Magnetization" and obtain a macroscopic relation for magnetization of a magnetic material subjected to homogenous magnetic field.

(10 marks)

Or

(b) (i) Explain the concept of compound semiconductor. (5 marks)

(ii) Write a note on formation of dipole. (4 marks)

(iii) Explain the concept of Hard and soft magnetic materials and its applications. (6 marks)

III. (a) (i) Derive the expression for polarization in liquid. (9 marks)

(ii) Derive the expression for electronic polarizability of gaseous dielectric. (6 marks)

Or

(b) (i) Derive and explain the expression for ionic and dipolar polarization in polyatomic gases.

(10 marks)

(ii) Write down main fractures of Ferro Electricity. (5 marks)

IV. (a) (i) Explain the factors influencing the dielectric strength of a material. (6 marks)

(ii) Give general properties of good insulator and also classify the insulators on the basis of temperature variation.

(9 marks)

Or

(b) (i) Discuss the properties and applications of the following materials :

(1) SF_6 ; (2) Porcelain ; (3) Rubber ; (4) Resins ; (5) Transformer oil.

(15 marks)

Turn over

V. (a) (i) Write a short note on Antireflection coatings. (5 marks)

(ii) Explain the essential properties of the material used in solar cells and give some of the examples.

(10 marks)

Or

(b) Explain in detail about the Modern Techniques for material studies like :

(a) Microscopy.

(b) Magnetic resonance.

(15 marks)

[4 × 15 = 60 marks]