

D 20916

(Pages : 2)

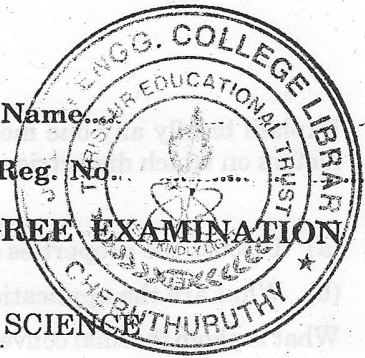
Name.....

Reg. No.....

**FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION  
OCTOBER 2011**

**EE/PTEE 09 506—ELECTRICAL MATERIAL SCIENCE**

(2009 Admissions)



Time : Three Hours

Maximum : 70 Marks

**Part A**

*Answer any five questions.*

1. What do you mean by contact potential in metal ?
2. How are magnetic materials classified ?
3. What is dielectric power loss ? On what factors does it depends ?
4. Define breakdown voltage of dielectric materials.
5. What is meant by resonance in magnetic field ?

(5 × 2 = 10 marks)

**Part B**

*Answer any four questions.*

1. Discuss briefly the attractive features of organic semiconductor and its application.
2. What are ferrites ? What are their electrical and magnetic characteristics ?
3. What are ferro electric materials ? Explain the hysteresis curve for a ferro electric materials.
4. Explain the phenomenon of polarization in dielectric materials.
5. Briefly discuss about the phenomena of electrothermal breakdown in solid dielectrics.
6. What are the materials used in solar cells ? Discuss their electrical properties.

(4 × 5 = 20 marks)

**Part C**

*Answer all questions.*

1. Explain Fermi-Dirac distribution function to describe the energy distribution in quantum mechanical system.

*Or*

2. Distinguish between hard and soft type of magnetic materials. Discuss the properties of Silicon-iron alloys and indicate their use in electrical machines.
3. Derive an expression for electric polarization in monoatomic gases. And deduce the expression for dielectric susceptibility to the electronic polarization of the atom.

*Or*

4. Discuss the following polarization mechanisms :  
(a) Ionic polarization ; (b) Dipolar polarization.

Turn over

5. Explain briefly any one mechanism that leads breakdown in gaseous dielectric. Also discuss the factors on which dielectric strength of gaseous dielectrics depends.

Or

6. (a) Discuss the properties of good insulator. Give its classification and examples (s) for each type.

(b) What are the application of transformer oil and  $\text{SF}_6$  gas in electrical field.

7. What is photo thermal conversion ? Describe the techniques used to improve the conversion efficiency.

Or

8. Write short notes :

(a) Solar cells.

(b) Ferromagnetic resonance.

(4 × 10 = 40 marks)