D 70296 (Pages : 2) Name.....

Reg. No.....

FIFTH SEMESTER B.TECH. (ENGINEERING) [09 SCHEME] DEGREE EXAMINATION, NOVEMBER 2014

EE/PTEE 09 506—ELECTRICAL MATERIAL SCIENCE

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. Define Fermi energy in metals.
2. Distinguish between Intrinsic and Extrinsic semiconductors.
3. What is dipole ?
4. Give any two examples for :
   (a) Solid dielectrics.
   (b) Gaseous dielectrics.
5. What is meant by photo thermal conversion ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

1. Discuss briefly the effect on temperature and composition on conductivity of the metal.
2. Brief the differences between Soft and Hard magnetic materials.
3. Explain the behaviour of dielectric under static electric field.
4. List the properties of goal insulator and its classification. Give few examples for each.
5. Define dielectric strength of dielectrics. Discuss the factors on which dielectric strength of gaseous dielectrics depends.
6. Explain briefly the working of solar and factors which affect the output of it.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

1. Discuss briefly the selection of materials for electrical resistances, brushes of electrical machines, lamp filaments, fuses and solders. Also explain the reason for their choice.

Or

Turn over

2. Explain briefly the term magnetic domain in ferromagnetic magnetic materials and effects of external field on domain configuration. Also discuss the factors on which the mobility of domain walls depends.

3. Explain briefly the following polarization mechanism :

   (a) Electronic polarization.

   (b) Ionic polarization.

Or

4. Discuss briefly the behaviour of dielectrics under alternating fields and hence carry out analysis on the effect of frequency and temperature on a.c. dielectric constant.

5. What is meant by breakdown in dielectrics ? Explain briefly the various mechanisms leads to breakdown in liquid dielectrics.

Or

6. Giving few examples for inorganic and organic insulating materials, discuss their properties and applications briefly.

7. Discuss briefly the various types of coatings used for enhanced solar thermal energy collection.

Or

8. Write short notes on :

   (i) Nuclear magnetic resonance.

   (ii) Electron spin resonance.

(4 × 10 = 40 marks)