D 12052 (Pages : 2) Name.....

Reg. No.....

FIFTH SEMESTER B.TECH. (ENGINEERING) [14 SCHEME] DEGREE EXAMINATION, NOVEMBER 2016

EE 14 506—ELECTRICAL MATERIAL SCIENCE

Time : Three Hours Maximum : 100 Marks

Part A

Answer **eight** *questions out of ten questions.*

1. What are the ferrites ? What are their electrical and magnetic materials ?
2. With hysteresis curve, explain the behavior of ferromagnetic material when its temperature is less than core temperature ?
3. Explain the phenomenon of polarization in dielectric materials.
4. Define the dielectric strength of the insulating material. Explain the types of materials used for insulation.
5. Explain the factors affecting dielectric strength.
6. Define dielectric breakdown and explain its mechanism.
7. Obtain the expression for dipole polarization in poly atomic gases.
8. Explain briefly mechanism of breakdown in gases. And also discuss the factors on which dielectric strength of gaseous dielectric depends.
9. Distinguish between the solid breakdown and dielectric breakdown.
10. List the characteristics of good insulating material and its classification according to temperature.

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*

11. Write the properties of magnetic materials. Explain detail about the magnetic material used in electrical machine. (15 marks)

Or

12. Explain briefly the determination of energy state of electron in a solid using Fermi-Dirac distribution function for different temperatures. (15 marks)
13. Discuss the following :—

    Homogeneity, linearity, dielectric constant, polarisability, isotropy. (15 marks)

Or

14. What are the types of dielectric materials ? Explain its application. (15 marks)

Turn over

15. What do you mean by a breakdown in dielectrics ? Explain the avalanche mechanism which describes break.

(15 marks)

Or

16. Give the classifications of insulator on temperature basis. Discuss briefly, the common insulating materials and their properties used in electrical apparatus.

(15 marks)

17. (a) What are the materials used in solar cells ? Discuss their electrical properties. (8 marks)

(b) Write the environmental access of solar energy conversion system. (7 marks)

Or

18. (a) Explain briefly the need of coating used for enhanced solar thermal energy collection and its various kinds.

(7 marks)

(b) Discuss briefly about various types of materials used in solar cells and its properties.

(8 marks)

[4 × 15 = 60 marks]