



Reg. No. :

Name :

**Fourth Semester B.Tech. Degree Examination, May 2014
(2008 Scheme)**

**Branch : ELECTRICAL AND ELECTRONICS
08.405 : Engineering Materials Science (E)**

Time : 3 Hours

Max. Marks : 100

PART – A

Answer **all** questions. **All** questions carry **equal** marks :

1. Explain the ionization by metastables.
2. What are the desirable properties of gaseous insulators ?
3. Explain penning effect when referred to gaseous discharges.
4. Mention the applications of SF₆ gas.
5. Describe the electronic breakdown in pure liquids.
6. What are treeing and tracking ?
7. Classify the solid insulating material based on temperature.
8. Distinguish para and ferromagnetic materials.
9. Mention the properties of thyrite and ZnO.
10. What is super conductivity ? **(4×10=40 Marks)**

PART – B

Answer **one** full question from **each** Module.

Module – 1

11. a) Explain the mechanism of development of anode and cathode streamers and explain how these leads to breakdown.



- b) What is time lag ? Discuss the its components and the factors which affect these components.

OR

12. a) Explain the current growth process in gaseous insulation and hence derive the condition for Townsend's criterion for breakdown.
- b) What are electronegative gases ? Why the breakdown strength is higher in these gases compared to that in other gases ?

Module – 2

13. a) Explain the Bubble theory and cavity breakdown for commercial liquid dielectrics.
- b) What is thermal breakdown in solid dielectrics and how is it practically more significant than other mechanisms ?

OR

14. a) With neat sketch discuss the treatment and testing of transformer oil.
- b) Explain the different mechanisms by which breakdown occurs in solid dielectrics.

Module – 3

15. a) Distinguish between soft and hard magnetic materials.
- b) Distinguish between ferromagnetic and anti-ferromagnetic materials.
- c) What are ferrites ?

OR

16. a) Narrate the properties of copper and aluminium.
- b) What is semiconductor ? With the held of band diagram explain P-type and n-type semiconductor.
- c) Mention the properties of thyrite and ZnO.

(20×3=60 Marks)