

Ref. No.: Ex/EE/T/223/2017

B.E. ELECTRICAL ENGINEERING 2ND YEAR 2ND SEMESTER EXAM 2017
ELECTRICAL ENGINEERING MATERIALS

Time : 3 Hrs

Full Marks : 100
(50 per part)

Part – I

Use Separate Answer scripts for each part.

Answer any three (3×16).

Two (02) marks reserved for neat and to the point answers.

All questions are of 08 marks.

1. (a) Deduce and discuss Curie-Weiss law for ferromagnetic material. What are paramagnetic and ferromagnetic Curie points?
(b) What are hard magnetic materials? How are they characterized? Discuss their usage in electrical machines.
2. (a) Explain magnetostriction for ferromagnetic materials.
(b) Explain Ferrimagnetism in magnetic materials. What are ferrites? What are their usage?
3. (a) Classify magnetic materials by the relative presence of permanent magnetic dipole moments.
(b) Discuss susceptibility vs temperature characteristics for different types of magnetic materials.
4. (a) Deduce and explain Fuse Equations (Preece's Law).
(b) Explain in brief different types of fuse and their usage.
5. (a) Deduce Joule's law of electrical heating from Drude model of electrical conduction.
(a) Explain Meissner effect for Superconductors.

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BACHELOR OF ENGINEERING IN ELECTRICAL ENGINEERING EXAMINATION, 2017

(2nd Year, 2nd Semester)

ELECTRICAL ENGINEERING MATERIALS

Time: Three Hours

Full Marks: 100

(50 marks for each part)

Use a separate Answer-script for each Part

PART-IIAnswer *any three* questions*Two marks* are reserved for neatness and well organized answer script

1. a) State some of the limitations of the "Simple Theory of Hydrogen Atom". Show that total energy of electron in Bohr's Hydrogen atom is inversely proportional to n^2 where the symbol is having usual meaning. 5+7
- b) Briefly explain "Nuclear Binding Energy" vs. "Mass Defect". 4
2. a) Discuss about (i) surface resistivity and (ii) dielectric dissipation factor of an insulating material. How dielectric dissipation factor depends on frequency of applied voltage? 10
- b) The insulation resistance of 100m cable was $750M\Omega$ at $30^\circ C$. The insulating material of the cable is such that an increase in $20^\circ C$ is required for reducing the insulation resistance to half the value at $30^\circ C$. What will be the insulation resistance of 50m of the cable at $70^\circ C$? 6
3. a) Explain insulators, semiconductors and conductors with the help of band theory of solids. 10
- b) Write a note on ionic and covalent bonding with examples. 6
4. What is synthetic resin? Discuss about a synthetic resin with respect to (i) Manufacturing Process, (ii) Molecular Formula, (iii) Properties and (iv) Applications. 16
5. Write short notes on any two of the followings: 8×2
 - (i) Cross-linked Polyethylene
 - (ii) Stable Interatomic Distance
 - (iii) Mica and Micanites
 - (iv) Frequency dependence of dielectric materials.