Ref. No. Ex /ET/EE/T/223/2019

B.E.E 2nd year 2nd Sem. EXAMINATION, 20 19

(1st/2nd Semester/Repeat/Supplementary/Spl. Supplementary/Old/Annual/Bi-Annual)

SUBJECT Electrical Engineering Materials
(Name in full)

PAPER .....

Time : Two hours/Three hours/Four hours/Six hours

Full Marks 30/ 100
(15/50 marks for each part)

Use a separate Answer-Script for each part

No. of questions	Part I Answer any three questions Two (02) marks reserved for neat and well organized answers.	Marks
Q1 i)	Explain magnetic susceptibility. Derive the relationship between susceptibility and magnetic field intensity. Show that it is an inherent property of the material.	8+8
ii)	With suitable derivation explain why susceptibility varies differently for different magnetic materials.	
Q2 i)	From Weiss theory of ferromagnetism, derive Curie-Weiss Law. Explain Ferromagnetic and paramagnetic Curie Temperatures.	8+8
ii)	Write short note on 'Domain Theory of Ferromagnetic Materials'.	
Q3 i)	What are Ferrites? Compare their magnetic characteristics with ferromagnetic materials.	8+8
ii)	What is magnetic anisotropy? How this property dictates the selection of magnetic materials in for Electrical apparatus?	
Q4 i)	From the Drude Model of conductivity derive Joules Law of Electrical heating.	8+8
ii)	Explain the factors to be taken into account while selecting a Fuse.	
Q5 i)	Explain the dependency between critical temperature, critical magnetic field and critical current density for Superconducting materials.	8+8
ii)	Show that superconducting materials are perfect diamagnetic.	

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Ex/EE/T/223/2019

B.E. ELECTRICAL ENGINEERING SECOND YEAR SECOND SEMESTER - 2019

ELECTRICAL ENGINEERING MATERIALS

Time: Three Hours | Full Marks: 100

(50 marks for each part)

Use a separate Answer-script for each Part

PART-II

Answer ***any three*** questions

Two marks are reserved for neatness and well organized answer script

1. a) Calculate the frequency and the energy of photons emitted if an electron in a hydrogen atom makes a transition from a quantum state of principle quantum number n=3 to the ground state. Given h = 6.62e-34 Js. 8

   b) Discuss about the limitations of Bohr's theory of hydrogen atom. 4

   c) Briefly explain "Nuclear Binding Energy" vs. "Mass Defect". 4

2. a) Explain about ionic and covalent bonding with examples 6

   b) Discuss about five significant electrical properties of insulating materials. 10

3. a) Discuss briefly about the thermal classification of insulating materials. 6

   b) Explain how dielectric polarization is related to the relative permittivity of the dielectric medium. 6

   c) Discuss about some important properties of transformer oil 4

4. a) Explain the nature of the relationship between dielectric strength and pressure for gaseous dielectric. Justify the use of compressed gas in high voltage systems. 8

   b) Explain the process of impregnation of paper with insulating oil. What is the use of this combination? 8

5. Write short notes on any two of the followings: 8×2

   (i) Cross-linked Polyethylene
   (ii) Porcelain
   (iii) Teflon