Ref No: EX/EE/5/T/122/2018

BACHELOR OF ELECTRICAL ENGINEERING (EVE) (1ST YR 2ST SEMESTER) EXAMINATION, 2018

(1st /2nd-Semester)

SUBJECT: - ELECTRICAL ENGINEERING MATERIAL

Full Marks 100

Time: ~~Two hours~~/Three hours/ ~~Four hours~~/ ~~Six hours~~ (50 marks for each part)

Use a separate Answer-Script for each part

No. of Questions	PART I	Marks
1.	***Answer question:-1 and any two from the rest.*** ***(Answer any four of the following:)*** a) Distinguish between the orbital angular momentum and spin momentum. b) Distinguish between hard and soft magnetization axis. c) Why the free electrons in conductor suffers by collision with neighboring atoms? d) Why strain is observed in ferromagnetic material, when they are subjected to strong magnetic field? e) Why magnetic material shows anisotropy? f) What is the significance of London penetration depth for superconducting state of element.	**4X5=20**
2.	a) Compare the magnetic property of Fe,Ni and Co in respect of Bohr magneton. b) Derive the expression of susceptibility of ferromagnetic material with the help of Curie-Weiss law. c) Explain why the angular frequency of an rotating electron will change when it is subjected to uniform magnetic field.	**5+5+5**
3.	a) Explain why the velocity of free electrons in conductor is uniform when the conductor is subjected to Uniform electric field. b) Define mobility and collision time of free electron	

[Turn over

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	c) State the significance of Mathiessen's rule and hence explain the effect of impurities on conductivity.	5+5+5
4.	a) Derive the expression of susceptibility of antiferromagnetic material having two elements molecular structure. b) State Messner effect for superconductor and hence prove that susceptibility in superconducting state has –ve sign.	
5.	**Write short notes on any three of the following:** a) Magnetistriction. b) Relaxation time c) AC conductivity. d) BCS theory of superconductor	7+8 3X5=15

Ex/EE/5/T/122/2018

B.E ELECTRICAL ENGINEERING (PART TIME) EXAMINATION, 2018

(1st 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-II

Answer ***any three*** questions

(Two marks are reserved for neatness and well organized answers)

1. a) State the postulates of Bohr's Atomic theory. 4
   b) Derive an expression for the total energy of an electron in the n^{th} orbit of a hydrogen atom. 8
   c) Discuss about the limitations of Bohr's Atomic theory. 4

2. a) Classify insulating materials in the light of thermal gradation with suitable examples. 8
   b) The insulation resistance of 200m length of a cable is 100MΩ at 25°C. An increase in 15°C reduces the insulation resistance to half the value at 25°C. Determine the insulation resistance of 100m of the cable at 15°C. 8

3. a) Derive an expression for the dielectric power loss of an insulating material. 8
   b) Define surface resistivity and volume resistivity of an insulating material. 4
   c) What is the difference between breakdown strength and breakdown voltage of an insulating material? 4

4. a) Write a brief note on transformer oil as a liquid insulating material. 8
   b) Discuss briefly about the breakdown phenomenon of a gaseous insulation in the light of collision mechanism. 4
   c) Draw and explain the nature of variation of breakdown voltage of gaseous insulation with pressure. 4

5. Write short notes on *any two* of the following: 8×2=16
   (i) Nuclear Binding Energy vis-à-vis Mass Defect.
   (ii) Epoxy resin.
   (iii) Porcelain Insulation.

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