

Menoufia University
 Faculty of Engineering, Shebin El-Kom
 Electrical Engineering Department
 Postgraduate-Master of science
 Final Term Exam



Subject/Code: Electrical Materials/ELE 608
 Year : 2014-2015
 Time Allowed : 3 hours
 Exam Date : 13 / 1 / 2015
 Total Marks : 100 marks

Allowed Tables and Charts: (None)

Answer the following questions

Question (1) **(30 Marks)**

(1-a) What is meant by super-conductivity? Does it occur with all metals? Give the applications of superconducting materials.

(1-b) Discuss the factors that must be considered in order to select suitable electrical materials.

(1-c) A resistance element having cross sectional area of 10 mm² and a length of 10 m takes a current of 4 A from a 220 V supply at ambient temperature of 20 °C. Find the current when the temperature rises to 60 °C. The resistance temperature coefficient at 20 °C is 0.0003/°C.

Question (2) **(20 Marks)**

(2-a) Discuss the factor affecting resistivity of electrical conductors.

(2-b) Compare between the properties of low and high resistivity materials.

(2-c) Give reasons for preferring copper for made of machine windings as compared to aluminum.

Question (3) **(25 Marks)**

(3-a) Discuss the breakdown mechanisms of gases, liquid, and solid dielectrics. Also, compare between the treeing and tracking breakdown of solid dielectrics.

(3-b) Explain the process of polarization of a dielectric materials. Also, give the physical concept of dielectric loss in a dielectric.

(3-c) Compare the properties and applications of rubber and glass as insulations.

Question (4) **(25 Marks)**

(4-a) Discuss the factors affecting semiconductor materials considering its applications.

(2-b) What is polymer nanocomposite and give its constituents?

(4-b) Discuss the importance of nanotechnology for enhancement tracking resistance, breakdown strength, and partial discharge of dielectric materials.

Good LuckProf. Mohamed Izzularab

Dr. Amr M. Abdelhady

This exam measures the following ILOs														
Skills	Knowledge & Understanding Skills					Intellectual Skills				Professional Skills				
	a1-1	a1-2	a1-2	a1.4	a3.2	b5-1	b6-2				c1-1	c1-2	c1.3	c4.2
Question Number	Q1-a,b	Q2-a,b	Q2-c	Q4-c	Q4-c,d	Q1-c,d	Q3-a,b,c				Q4-a	Q4-b	Q4-c	Q4-a,b