Menoufia University
Faculty of Engineering, Shebin El-Kom
Electrical Engineering Department
Postgraduate-Master of science
Second Semester

Subject/Code: High and Extra-High Voltage Engineering/ ELE 607
Year : 2015-2016
Time Allowed : 3 hours
Exam Date : 4 / 6 / 2016
Total Marks : 100 marks

Answer the following questions

Question 1 *(25 marks)*

(1-a) Discuss the flashover phenomena across H.V. insulator surfaces in air considering mechanisms and critical voltage calculations of the flashover.

(1-b) Compare between breakdown gradient characteristics of impulse, alternating and D.C voltages considering rod-plane gaps.

(1-c) Discuss the pre-breakdown discharges phenomena.

Question 2 *(25 marks)*

(2-a) Discuss the four IEEE conditions in dissolved gas analysis that guide to classify the risks to transformers.

(2-b) Discuss how to measure partial discharge considering straight discharge detection circuit.

(2-d) Explain with sketches the three electrode arrangement used in solid and liquid dielectric measurements.

Question 3 *(25 marks)*

(3-a) Discuss the lightning mechanism.

(3-b) Compare between lightning overvoltages protection considering spark gap and surge arresters.

(3-c) Compare the performance characteristics of silicon carbide arrester with a zinc oxide arrester. What are the advantages and disadvantages of each?

(3-d) Explain how to select surge arrester rating in extra high voltage system. Give an example.

Question 4 *(25 marks)*

(4-a) Write short notes on: Temperature deterioration coefficient- Life expectancy factor- Safety factors.

(4-b) Discuss the effect of temperature on breakdown stress in extra high voltage cables.

(4-c) A 3-phase 275 kV cable system consisting of 3 single-core cables is designed to operate at a maximum voltage of 287 kV, line-to-line. Its life is expected to be 30 years. In the factory, a 15 minute test is intended to be given. Taking n = 12, calculate the magnitude of test voltage to be applied between conductor and sheath that will simulate service conditions using maximum continuous voltage as the basis for design.

With our best wishes

Prof. Dr. Mohamed Izzularab and Dr. Amr Abdelhady

This exam measures the following ILOs								
Skills	Knowledge&Understanding Skills				Intellectual Skills			Professional Skills
	a1.1	a1.2	a1.5	a1.3	b1.2	b5.1	b5.3	c4.3
Question Number	1b	1a	2a,b,c	4a,c	3c	1c	4b	3a.b.d