MinoufiyaUniversity Faculty of Engineering, Shebin El-Kom Electrical Engineering Department SummerSemester Examination,2014 Exam Date :/9/2014	Subject:High and Extra-High Voltage Engineering Code: ELE 607 Year:Preliminary Master Time Allowed : 3 hours Total Marks : 100 marks

Answer the following questions

Question 1 *(30 marks)*

(a) Describe the characteristic profile of the U curve with impulse voltages and indicate the reason for this profile.
(b) Discuss briefly the formation processes of pre-breakdown corona and sparkover in a system with highly stressed positive and negative electrodes.
(c) Discuss the sparkover characteristics for switching impulse conditions and rod-plane gaps.

Question 2 *(25marks)*

(a) Expand the following abbreviations for insulation type: HPOF, XLPE, PPLP and SF6. Then declare which type has lower relative permittivity.
(b) Deduce the maximum and minimum electric stresses cable insulation. Then show how to minimize the maximum one.
(c) Classify the cooling types of extra high voltagecables with declaring the laying methods in the soil. Then show the restrictions of applying these methods in practice.

Question 3 *(20marks)*

(a) Explain the procedure for selecting surge arrester for extra high voltage system.
(b) What are principles of the insulation co-ordination based on lightning?

Question 4 *(25 marks)*

(a)Briefly discuss the mechanism of lightning stroke to EHV tower.

(b) A 400-kV horizontal line has 22 discs in the insulator and two ground wires spaced 15 metres apart at 20 m height at mid-span and 26 m at the tower. The tower-footing resistance is 40 ohms. The surge impedances are: Ground wire: 500 ohms, stroke: 400 ohms. Assume 60% of strokes to contact within 1/4span of line from the tower and at the tower top. The coupling factor between ground and phase conductor is 0.2 and the factor in N_S is 0.2. The isokeraunik level is 60 thunderstorm days per year. Calculate the number of tripouts per year per 100 km of line.
Take, $N_s = 0.2\, I_{kl}\, (0.0133\, (h_t + 2\, h_g) + 0.1\, s_g)$.

With our best wishes

Prof. Dr. Mohamed Izzularab and Dr. NehmdohSabiha

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,c	4a	2b	1c	4b	3