Ref No.: Ex/PG/EE/T/128G/2019

M.E. ELECTRICAL ENGINEERING FIRST YEAR SECOND SEMESTER - 2019

SUBJECT: HIGH VOLTAGE EQUIPMENT (HV)

Time: Three Hours | Full Marks: 100

Question No.			Marks

Answer any five questions

1.	(a)	Discuss about various properties of insulation in High Voltage Transformer which are investigated for assessing its condition.	8
	(b)	What are the various winding used in high voltage transformer? Briefly discuss about it.	8
	(c)	What do you mean by 'Flash point' and 'Pour point' of liquid insulation?	4
2.	(a)	Explain briefly about how transformer life is degraded with deterioration of oil and paper insulation.	6
	(b)	What do you mean by weighted ambient temperature for degradation of transformer insulation? Show the relationship among Weighted Ambient, Winding Rise and Hot-spot Temperatures.	10
	(c)	Explain the possible effects due to loading of transformer beyond the rating given in nameplate.	4
3.	(a)	What do you mean by partial discharge in high voltage equipment? Explain how partial discharge in high voltage equipment accelerates its degradation.	5
	(b)	Discuss about the theoretical background for measuring partial discharge in high voltage equipment.	10
	(c)	What are the different techniques used for detecting the partial discharge location in critical equipments?	5
4.	(a)	What do you mean by Bushing of high voltage equipment? Discuss about various type of bushing used in case of critical equipments?	12
	(b)	What are testing techniques of high voltage bushing? Discuss briefly about it.	8
5.	(a)	Discuss about how arc is developed in case of circuit breaker? Explain the theories behind the interruption of arc developed during breaking of circuit.	12
	(b)	Briefly discuss about the working of the following circuit breaker (i) Sulphur Hexafluoride (SF_6) C.B (ii) Air Blast (AB) C.B	8

6. (a) Discuss briefly the limitations of Air Insulated Substation. How these limitations can be eliminated through Gas Insulated Substation? 14

(b) What are the drawbacks of Gas Insulated Substation? 6

7. Write short notes on any four of the following: 4×5

(i) Dissolved Gas Analysis (DGA)
(ii) Furan analysis of transformer insulation
(iii) Impulse testing of transformer insulation
(iv) Factors affecting the design of bushing
(v) Routine test of transformer
(vi) Vacuum Circuit Breaker