Exam No: _____

GANPAT UNIVERSITY
B. TECH SEM- V (ELECTRICAL)
REGULAR EXAMINATION NOV-DEC 2016
2EE505: HIGH VOLTAGE ENGINEERING

TIME: 3 HRS **TOTAL MARKS: 60**

Instructions: (1) This Question paper has two sections. Attempt each section in separate answer book.
(2) Figures on right indicate marks.
(3) Be precise and to the point in answering the descriptive questions.

SECTION- I

Que.-1 **(A)** An eight stage Cockcroft-Walton Generator Circuit has all capacitors of 0.06 μF. The secondary voltage of the supply transformer is 100 kV at a frequency of 150 Hz. If the load current is 1mA, determine the voltage regulation and the ripple of CWGC. **[05]**

(B) Explain the principle of operation of (i) series (ii) parallel resonant circuits with neat diagram. Compare their performance and explain their advantages and disadvantages. **[05]**

OR

Que.-1 **(A)** What do you mean by an electrostatic generator? Describe principle of operation, application and limitations of Van de Graf generator with neat diagram. **[05]**

(B) A tesla coil has a primary winding rated for 10 kV. If L_1, L_2 and co-efficient of coupling K are 10mH, 200 mH and 0.6 respectively, find the peak value of the output voltage if the capacitance in the primary side is 2.0 μF and that on the secondary side is 1nF. Neglect the winding resistance. Find also the highest resonant frequency produced with rated voltage applied. **[05]**

Que.-2 **(A)** Define lightning impulse voltage and discuss RLC circuit used for impulse voltage generation. **[04]**

(B) Draw the modified Mark's generator circuit. **[02]**

(C) Enlist main types of insulators and explain testing of high voltage insulators. **[04]**

OR

Que.-2 **(A)** Explain capacitance voltage Transformer with its schematic representation, Equivalent circuit & its phasor diagram. **[05]**

(B) An 8-stage impulse generator has 0.12 μF capacitors rated for 167 kV. What is its maximum discharge energy? If it has to produce a 1/50 μs waveform across a load capacitor of 15,000 pF, find the values of the wave front and wave tail resistances. **[05]**

Que.-3 **Attempt any Two:**

(A) Which are the different factors that affects the spark over voltage of sphere gap? Discuss any two in detail. **[05]**

(B) Draw Cockcroft-Walton voltage multiplier circuit also derive an expression for ripple voltage of a multistage Cockcroft-Walton Circuit **[05]**

(C) Write a short note on generating voltmeter. **[05]**

SECTION-II

Que.-4 **(A)** A solid specimen of dielectric has a dielectric constant of 4.2, and tan δ =0.001 at a frequency of 50 Hz. If it is subjected to an alternating field of 50 kV/cm, calculate the heat generated in the specimen due to the dielectric loss. **[04]**

(B) Enlist desirable dielectric properties of solid. **[02]**

(C) Draw the layout of UHV laboratory. **[04]**

OR

Que.-4	(A)	Explain electromechanical breakdown of insulation.	[05]
	(B)	Discuss photo ionization and electron attachment process regarding to gaseous breakdown.	[05]
Que.-5	(A)	Explain the Townsend's breakdown criterion for gaseous dielectrics.	[05]
	(B)	Explain the characteristics of liquid dielectrics.	[05]

OR

Que.-5	(A)	Why does liquid purification require? Write a short note on liquid purification system with suitable sketch.	[04]
	(B)	Compare different liquid dielectric materials used in electrical fields.	[04]
	(C)	Draw the circuit diagram which gives support to the given ionization equation: $e^- +$ Atom = Positive Ion + $e^- + e^-$.	[02]
Que.-6		**Attempt any Two:**	
	(A)	Write a short note on "Grounding of impulse testing laboratories."	[05]
	(B)	Give the brief view about any two measuring circuit of DC resistivity measurement for non-destructive testing.	[05]
	(C)	Explain the high voltage testing of isolators in HV laboratory.	[05]

END OF PAPER