

**III B.Tech II Semester Supplementary Examinations,  
November/December 2005  
HIGH VOLTAGE ENGINEERING  
(Electrical & Electronic Engineering)**

**Time: 3 hours****Max Marks: 80**

**Answer any FIVE Questions  
All Questions carry equal marks**

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1. (a) Derive the fundamental equations for kinetic energy of gases.  
(b) What do you understand from the terms elastic collision, effective cross sections by molecules. What is the relationship between these two? Explain. [8+8]
2. (a) Explain and compare the performance of half wave rectifier and voltage doubler circuits for generation of high d.c. voltages.  
(b) A Ten stage Cockroft-Walton circuit has all capacitors of  $0.06 \mu F$ . The Secondary voltage of the supply transformer is 100 kv at a frequency of 150 HZ. If the load current is 1mA, Find
  - i. voltage Regulation
  - ii. the ripple[8+8]
3. (a) Explain with a neat sketch three electrode gap for high current switching.  
(b) Calculate the peak current and wave shape of the output current of the following generator. the total capacitance of the generator is  $53 \mu F$ . The charging voltage is 200 KV. The circuit inductance is 1.47 mH, and the dynamic resistance of the test object is  $0.05 \Omega$  [8+8]
4. Explain with neat diagram, the principle of operation of
  - (a) series
  - (b) Parallel resonant circuits for generating high a.c. voltages. Compare their performance. [16]
5. (a) Derive an expression for voltage efficiency of single stage impulse generator.  
(b) An impulse current generator has a total capacitance of  $15 \mu F$ , the charging voltage of 125 KV, the circuit inductance is 2 mH and the dynamic resistance is 1 ohm. Find the peak current and wave shape of the wave. [8+8]
6. What are the requirements of a sphere gap for measurement of high voltages? Discuss the advantages of sphere gap for measurements. [16]
7. (a) What is the force developed in electro static voltmeter? Explain.

- (b) A Ragowskii Coil is required to measure impulse current of 8 KA having rate of change of current of  $10^{10}$  A/sec. The voltmeter is connected across the integrating circuit which reads 8 volts for full scale deflection. The input to the integrating circuit is from the Ragowskii coil. Determine the mutual inductance of the coil, R and C of the integrating circuit. [8+8]
8. (a) What is an inverted Schering bridge ? Give its applications.
- (b) Discuss the method of balance detection for locating partial discharges in the electrical equipments.
- (c) List various 'Type Tests' carried on capacitors and explain them. [6+6+4]

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