

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

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) What is electron attachment? Why are electron attaching gases are useful for practical use as insulants compared to non- attaching gases.
(b) Define and Explain
 - i. Negative ion formulation
 - ii. Electron affinity
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
3. (a) Explain clearly why is controlled tripping necessary
(b) An impulse generator has 12 capacitors of $0.12 \mu F$ and 200 kV rating. The wave front and wave tail resistances are 1.25 kilo ohms and 4 kilo ohms respectively. If the load capacitance including that of the test object is 10,000 PF, Find the wave front and wave tail times and the peak voltage of impulse wave produced.
4. (a) Explain why the use of series resistant transformers are advantages over a.c. testing transformers .
(b) The primary and secondary winding inductances of a tesla coil are 0.093H and 0.011 H respectively with a mutual inductance between the winding equal to 0.025 H. The capacitances included in the primary and secondary circuits are $1.5 \mu F$ and 18 nF. If the tesla coil is changed through a 10 kv d.c. supply , find the output voltage and determine its output waveform. Neglect the winding resistance.
5. (a) Draw a typical impulse current generator circuit and explain its operation and application.
(b) A 12 – stage impulse generator has capacitors each rated at $0.3 \mu F$, 150 KV. The capacitance of the test specimen is 400 pF. Find the wave front and wave tail resistances to produce $1.2/50 \mu sec$ impulse wave.
6. Write short notes on:

- (a) Surge Recorder.
 - (b) Voltage Dividers
 - (c) Sphere gap.
7. (a) Give the schematic arrangement of an impulse potential divider with an oscilloscope connected for measuring impulse voltages. Explain the arrangement used to minimize errors.
- (b) Calculate the correction factors for atmospheric conditions, if the laboratory temperature is 37°C , the atmospheric pressure is 750 mm Hg, and the wet bulb temperature is 27°C
8. (a) What are partial discharges. Differentiate between internal and external discharges
- (b) Write a short note on the measuring impedance circuit for the estimation of partial discharges
