

Code No: 07A60201

R07**Set No. 2**

III B.Tech II Semester Examinations, December 2010

INSTRUMENTATION**Electrical And Electronics Engineering****Time: 3 hours****Max Marks: 80****Answer any FIVE Questions****All Questions carry equal marks**

1. What is mechanisms of lightning stroke? What are the parameters and charecteristics of it? [16]
2. What do you mean by 'Intrinsic strength' of a solid dielectric? Explain the Intrinsic breakdown of solid dielectric. [16]
3. Explain the applications of insulating materials in the construction of circuit breakers. [16]
4. What is the significance of impulse tests? Explain briefly the impulse testing of insulators? [16]
5. (a) Derive an expression for ripple voltage of a multi-stage Cockroft-Walton Circuit. [16]
 (b) A 10-stage Cockroft -Walton circuit has all capacitors of $0.06 \mu\text{F}$. The secondary voltage of the supply transformer is 100 kV at a frequency of 150 Hz. If the load current is 1mA, find
 i. The optimum number of stages for maximum output voltage.
 ii. The maximum out put voltage. [8+8]
6. Explain the high voltage Schering bridge for the $\tan \delta$ and capacitance measurement of insulators (or) bushings? [16]
7. (a) What are the different types of resistive shunts used for impulse current measurements? Discuss their characteristics and limitations.
 (b) Explain the necessity of earthing and shielding arrangements to impulse measurements and to high voltage laboratories [8+8]
8. Two excited hydrogen atoms (first excitation level) collide with each other. Determine if this collision would lead to ionization, and what would be the wavelength of radiation in such an eventuality. [16]

Code No: 07A60201

R07**Set No. 4**

III B.Tech II Semester Examinations, December 2010

INSTRUMENTATION**Electrical And Electronics Engineering****Time: 3 hours****Max Marks: 80****Answer any FIVE Questions****All Questions carry equal marks**

1. What is a switching surge? What are the various origins of the switching surge? [16]
2. Define Townsend's first and second ionization coefficients. Explain the Townsend's criterion for a spark breakdown. [8+8]
3. What are the various electrical and nonelectrical tests on cables which can be conducted? [16]
4. Explain the properties and applications of Rubber solid insulating material used in high voltage engineering. Also explain how it is more suitable for cable insulation. [16]
5. Briefly explain how partial discharges in an insulation system or equipment can be detected and displayed. [16]
6. (a) Draw a typical impulse current generator circuit and explain its operation and application.
(b) A 10-Stage impulse generator has $0.250 \mu\text{F}$ condensers. The wave front and wave tail resistances are 75 ohms and 2600 ohms respectively. If the load capacitance is 2.5 nF , determine the wave front and wave tail times of the impulse wave. [8+8]
7. Discuss about surge voltage and their distribution and control in high voltage power apparatus. [16]
8. (a) Describe the generating voltmeter used for measuring high d.c voltages. How does it compare with a potential divider for measuring high dc currents.
(b) A generating voltmeter is to read 250kV with an indicating meter having a range of (0-20) μA Calibrated accordingly . Calculate the capacitance of the generating voltmeter when the driving motor rotates at a constant speed of 1500 Rpm [8+8]

Code No: 07A60201

R07**Set No. 1**

III B.Tech II Semester Examinations, December 2010

INSTRUMENTATION

Electrical And Electronics Engineering

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. Briefly explain the methods used for calibrating the partial discharge detectors [16]
2. Explain thermal breakdown in solid dielectrics. How this mechanism is more significant than the other mechanisms. [16]
3. Write short notes on:
 - (a) Photo-ionization
 - (b) Secondary ionization. [8+8]
4. Explain how a sphere gap can be used to measure the peak value of voltages. What are the parameters and factors that influence such voltage measurement? [16]
5. Discuss the applications of solid insulating materials in high voltage dry type transformers. [16]
6. (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 $0.3 \mu\text{F}$, 150 kV. The capacitance of the test specimen is 400 pF. Find the wave front and wave tail Resistances to produce a $1.2/50 \mu\text{s}$ impulse wave. Also determine the maximum output voltage if the charging voltage is 125 kV [8+8]
7. Describe the impulse current tests performed on lightning arrestors. How do you conclude that the arrester has passed the test? [16]
8. Discuss the power frequency over voltages in power systems. Explain various protection schemes employed to suppress the over voltages? [16]

Code No: 07A60201

R07**Set No. 3**

III B.Tech II Semester Examinations, December 2010

INSTRUMENTATION**Electrical And Electronics Engineering****Time: 3 hours****Max Marks: 80****Answer any FIVE Questions****All Questions carry equal marks**

1. Explain the special features and applications of Epoxy resin solid insulation. [16]
2. Explain the applications of insulating materials in the construction of capacitors. [16]
3. (a) What are the advantages and disadvantages of an electrostatic voltmeter when used to measure high voltages.
(b) What is a mixed potential divider? How is it used for impulse voltage measurements. [8+8]
4. (a) Derive an expression of Ripple voltage of a multistage Cockroft-Walton circuit.
(b) A ten stage Cockroft-Walton circuit has all capacitors of $0.06 \mu\text{F}$. The secondary voltage of the supply transformer is 100 kV at frequency of 150 Hz. If the load current is 1 mA, find
 - i. the optimum number of stages for maximum output voltage
 - ii. the maximum output voltage. [8+8]
5. Explain with neat diagram basic principle of pulse current measurement for estimation of partial discharges? [16]
6. (a) State Pachen's law and explain about its Pachen's curve.
(b) Derive an expression for the minimum 'pd' value of the Pachen's curve from the first principles. [8+8]
7. Explain the importance of radio interference voltage (RIV) measurements for EHV power apparatus. Explain with a schematic diagram one method of measuring RIV of Transmission line hardware? [16]
8. What are the various causes for over voltages in EHV Systems? what are the measures taken to control/reduce the overvoltages. [16]
