

Code No: B5603/D5603

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M.Tech II Semester Examinations, March/April 2011

SURGE PHENOMENON AND INSULATION COORDINATION

(POWER SYSTEMS HIGH VOLTAGE)

Time: 3hours

Max. Marks: 60

Answer any five questions

All questions carry equal marks

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1. a) Explain with suitable figures variation of voltage on short circuit end long transmission line when a surge of magnitude E initiated.
- b) Derive reflection and refraction coefficients for open circuit end transmission line. [6+6]
2. a) Discuss Bewley's lattice diagram with respect to three substations.
- b) Derive n^{th} reflection voltage formula when the transmission line end is connected to resistive load R. [6+6]
3. a) With suitable diagrams discuss the mechanism of lightning stroke.
- b) Explain the remedial methods to reduce switching over voltages. [6+6]
4. With a neat diagram discuss various apparatus of high voltage A.C circuit breakers. [12]
5. a) Explain the significance of tower footing resistance.
- b) Explain how the rotating machine will be protected against surges. [6+6]
6. Classify and explain different breakdown models of long gaps with non-uniform fields. [12]
7. Define following terms:

i) Critical Flash over voltage	ii) B.I.L
ii) Horn Gaps	iv) Counter Poise
v) Attenuation	vi) Insulation coordination. [12]
8. An over head line with an inductance and capacitance per km of 1.24 mH and 0.087 μ F respectively is connected in series with an underground cable having an inductance and capacitance of 0.185mH/km and 0.285 μ F/km. Calculate the values of refracted and reflected waves of voltage and current at the junction due to a voltage surge of 110KV travelling to the junction (i) along the line towards the cable (ii) along the cable towards the line. [12]
