

Roll No

MEPS - 205

M.E./M.Tech. II Semester

Examination, June 2016

Power System Transients

Time : Three Hours

Maximum Marks : 70

- Note : i) Attempt any five questions.
ii) All questions carry equal marks.

1. a) What are transients? Write about
 - i) Sub transient
 - ii) Transient state
 - iii) Steady state
- b) Why are transients produced while switching on inductor in an AC circuit? Why DC components is different in all three phases AC system?
2. a) Derive how does voltage transient produced while switching on capacitor in an AC circuit?
- b) Write down various methods to de-energise transients. Also write down the importance and effects of earth wire on transients.
3. a) Explain the phenomena of current chopping regarding circuit breaker.
- b) A 50 Hz 3- ϕ synchronous generator has an inductance per phase of 1.75mH and its neutral is grounded. It feeds a line through a circuit breaker. The total stray capacitance to ground of generator and circuit breaker is $0.0025 \mu F$. A fault occurs just beyond the circuit breaker. Which opens when symmetrical short circuit current is 7500A.

Ignoring first pole to clear factor, determine the following:

- i) Natural frequency
 - ii) Peak value of TRV
 - iii) Time at which peak value of TRV occurs
 - iv) Maximum rate of rise of TRV
4. a) Explain the effect of trapped charges and source in short line transient studies.
 - b) What are the two theories regarding lightning phenomena? Explain them briefly.
 5. a) What are reflection and refraction of travelling waves? Derive their values for open circuit and short circuit lines.
 - b) Explain switching, Resonance and lightning over voltages.
 6. a) Enlist various methods of protection of power system apparatus against surges. Explain any one of them.
 - b) Define the following terms regarding insulation co-ordination
 - i) BIL
 - ii) CFO voltage
 - iii) Impulse ratio
 - iv) Standard impulse test wave
 - v) Insulation coordination
 7. a) What is neutral earthing? Write down its advantages and the rules of neutral earthing.
 - b) What is the importance of Fourier transforms in transient analysis?
 8. Write a short note on any two
 - a) Surge impedance loading
 - b) PSCADA package
 - c) Source of transients
 - d) Restriking voltage
