

UNIT – I

Introduction and survey

Part-A

1. What are the sources of transients?
2. What are the causes of transients in a power system?
3. State the importance of transient study in planning.
4. List the effects of transients in power system.
5. Name the various types of Transients in power system.
6. What are the effects of lightning transients?

Part-B

1. What are the different types of power system transients? Explain in detail any two power system transients with neat diagrams
2. Explain the effects of transients on power system.
3. Briefly explain the importance of study of transients in planning.
4. (i). Write a short note on voltage surge.
(ii). Give a brief note about the importance of transient study in planning
5. Explain any one of the source of transients. Also discuss in detail the effect on power systems.

UNIT – II

Switching transients

Part-A

1. What are the causes of switching surges?
2. What is meant by resistance switching?
3. What is meant by capacitance switching?
4. Define current chopping.
5. What are the observations in RLC circuit?
6. Draw the equivalent circuit for interrupting the resistor current.
7. What is meant by load switching?
8. Define normal and abnormal switching transients.
9. What are the effects of source regulation?
10. What is Ferro resonance?
11. What is restriking voltage?
12. Draw the double frequency transient circuit with an example.
13. Give the relation between time constant of parallel and series circuit.
14. What is meant by current chopping?

Part-B

1. Explain with appropriate waveform,
 - (i) Current suppression.

- (ii) Current chopping
 - (iii) Capacitance switching with one and multiple resrikes.
 - (iv) Ferro resonance.
2. Explain in detail about,
 - (i) Resistance switching and
 - (ii) Load switching with their equivalent circuits.
 3. Explain the load switching in both normal and abnormal conditions with neat sketches.
 4. What is capacitance switching? Explain in briefly the effects of source regulations and capacitance switching with a restrike and multiple restriking transients.
 5. Draw an equivalent circuit for the resistance switching and explain the equivalent circuit for interrupting resistor current. Also explain RL circuit with sine wave drive
 6. Derive an expression for the transient currents in a RLC circuit when
 - a). $R=0$ and
 - b). $R^2/4L^2=1/LC$

UNIT – III

Lightning transients

PART-A

1. List the characteristics features of lightning strokes.
2. What is tower footing resistance?
3. What is arcing ground?
4. What are the causes of over voltage?
5. Define lightning phenomenon.
6. Define Isokeraunic level.
7. What are the protective devices used to protect power system equipments against lightning?
8. What are the types of protection afforded by ground wires?
9. Define dart leader.
10. Write short note about stepped leader and pilot streamer.
11. List two factors contributing to good transmission line design.

Part-B

1. Discuss the mechanism of lightning strokes and over voltages on transmission lines.
2. Discuss the different theories of charge formation of thunder clouds.
3. Explain in detail how the charges are formed in the clouds.
4. Explain about grounding a line structure.
5. Discuss the interaction of lightning with power system.
6. What are the factors contributing to good line design?
7. Explain the counter-poise method of protection.
8. Explain about tower footing resistance.
8. (a) Give the mathematical models for lightning discharges and explain them.
- (b) Explain the different characteristics of the lightning strokes.

UNIT – IV

Travelling waves on transmission line computation of transients

Part-A

1. What do you mean by travelling waves?

2. What are the properties of a good transmission line?
3. What are the damages caused by the travelling waves?
4. How are travelling lines classified?
5. What is the importance of Bewley's lattice diagram?
6. What is the application of Bewley's lattice diagram?
7. What are the specifications of a traveling wave?
8. Draw the equivalent circuit for an infinitesimal element of a line.
9. Draw the circuit of long transmission line with lumped parameters.
10. Write the expression for series and shunt lumped parameters in distributed lines.
11. Define standing waves and natural frequencies.
12. Define standing wave ratio (SWR).
13. What is meant by reflection and refraction of traveling waves.

Part-B

1. Discuss transient response of systems with series and shunt lumped parameters and distributed lines.
2. With neat sketch explain Bewley's Lattice diagram.
3. Derive the reflection and refraction coefficients of a traveling wave.
4. Write short notes on standing waves and natural frequency.
5. Explain the various type of traveling wave concept in step response.

UNIT – V

Transients in integrated power system

Part-A

1. What is load rejection?
2. How does a surge occur during switching?
3. Mention any four causes of switching surges.
4. Define about kilo metric fault.
5. What meant by distribution of voltage in a power system?
6. What is meant by line dropping?
7. Explain the over voltage induced by faults.
8. Define over voltage in the context of integrated power system.
9. What are the switching surges on integrated system?
10. Explain EMTP for transient computation.
11. State the application of EMTP.

Part-B

1. Explain short line kilometric fault.
2. What is line dropping and load rejection? Explain.
3. Explain switching surges on integrated system.
4. Explain the network modeling for EMTP transient computation.
5. Explain the computational procedure for EMTP calculation with neat flowchart.
6. Explain in detail how EMTP is used for the computation of transients in a power system.
7. Explain the over voltage induced by faults.