

VALLIAMMAI ENGINEERING COLLEGE
S.R.M NAGAR KATTANKULATHUR

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
QUESTION BANK

CLASS: ME-POWER SYSTEMS

YEAR & SEM: I / I

SUBJECT: PS7103-ELECTRICAL TRANSIENTS IN POWER SYSTEM

UNIT-1
PART-A

1. What are the causes of transients?
2. Name the different types of transients?
3. What is meant by current chopping?
4. What is meant by striking distance?
5. Mention any four causes of switching surges?
6. What are the parameters in Lightning flash
7. What is meant by Substation grounding grid?
8. What is extended grounding system?
9. What is meant by current Suppression?
10. What is meant by dart steamer?
11. Define frequency oscillation in lightning flash?
12. How to classify the grounding for protection against lightning?
13. What are the causes of transients?
14. Name the different types of transients?
15. What is meant by current chopping?
16. Mention any four causes of switching surges?

PART-B

1. write short notes on cloud formation? (8)
2. Explain the mechanism of Lightning discharge? (8)
3. Explain the parameters of lightning flash? (16)
4. What is the function of protective shadow? (8)
5. How to calculate the striking distance? (8)
6. Explain Dynamic tower footing resistance? (16)
7. Explain Direct lightning strokes to overhead lines, with shield Wires. (16)
8. Explain Direct lightning strokes to overhead lines, without shield Wires. (16)
9. Explain steady-state tower footing resistance? (16)
10. Explain Electrogeometric model for lightning strike?
11. Explain Direct lightning strokes to overhead lines, without shield Wires. (16)
12. What happened, when stepped leader striking different object and explain neat diagram (16)
13. Explain Direct lightning strokes to overhead lines, with shield Wires (16)
14. Explain Pilot Streamer and stepped leader of the lightning flash (8)

15. Explain the Mechanism of the stepped leader? (8)
16. Explain the striking distance of lightning flash? (8)

UNIT-II PART-A

1. What are the parameters in Lightning flash?
2. What is meant by Substation grounding grid?
3. What is meant by Switching Surges?
4. What are the phenomenon in switching transients
5. What is gap-factor?
6. What is External Insulation?
7. What is Air density correction factor?
8. Draw the Equivalent circuits for line-to-line fault?
9. What are the parameters in Lightning flash?
10. What is Ferroresonance
11. What is Leader progression method?
12. How the Insulation of an electric power system classified?
13. What is K_d ?
14. Draw breakdown phenomenon of a rod-rod air gap?
15. What are the parameters in Lightning flash?
16. What is CFO?

PART-B

1. Explain the concept of Switching transients? (16)
2. Mention the phenomenon in Switching transients? (16)
3. What is the function of protective shadow? (8)
4. How to calculate recovery voltage in compound Transient? (8)
5. Explain simulation of switching transients? (16)
6. Explain overvoltages caused by load rejection under switching surges?
7. Explain the Physical Mechanism of Air Breakdown ? (8)
8. Explain the performance of External Insulation under Switching surges? (16)
9. Explain Gap factor method and leader progression method? (16)
10. Explain single line-to-ground fault under Switching surges? (16)
11. Compute sequence impedances of switching surges? (16)
12. Explain Critical Flashover Voltage of External Insulation (16)
13. Explain the Physical Mechanism of Air Breakdown ? (8)
14. Explain Flashover voltage under phase-to-phase switching surge? (8)
15. Explain the performance of Internal Insulation under Switching surges? (6)
16. Explain Control of Switching Surges? (10)
17. Effects of Atmospheric Condition on Switching Surges? (8)
18. Explain Phase-to-Phase Switching Surges? (8)
19. Explain Load rejection under Switching surges? (8)

20. Explain VFTO of Switching Surges? (8)
21. Explain line-to-line fault in switching surges? (16)

UNIT-III
PART-A

1. What is voltage reflection coefficient ?
2. What is the gap configuration for rod-plane and rod-rod?
3. What is incident wave?
4. What is backward wave?
5. What is voltage reflection coefficient ?
6. What is the gap configuration for rod-structure and conductor-rod?
7. At what we call transmission line as distortionless?
8. Draw Equivalent circuit of a differential-length line segment?

PART-B

1. Explain reflection and refraction of transmission waves? (16)
2. Explain Attenuation and Distortion (8)
3. Explain Lattice diagram? (8)
4. Explain multi-conductor system of travelling waves in transmission lines? (16)
5. Explain multi-velocity waves of travelling waves in transmission lines? (16)
6. Derive Wave equation of travelling waves in transmission lines? (8)
7. Explain Attenuation and Distortion? (8)
8. Explain Lattice diagram? (16)
9. Explain multi-conductor system of travelling waves in transmission lines? (16)
10. Explain multi-velocity waves of travelling waves in transmission lines? (16)

UNIT-IV
PART-A

1. What is known as insulation co-ordination?
2. Define Earth Fault Factor S_d ?
3. What is short disconnection and long disconnection?
4. Define Power Frequency overvoltage?
5. Define Switching overvoltage?
6. What is Lightning overvoltage
7. What is Gas Insulated substation?
8. What is Gas Insulated substation?
9. What are the over voltage protection devices used in substation?
10. What are the factors that influencing the Lightning induced voltages on transmission lines?
11. What is known as insulation co-ordination?
12. What is a substation?
13. Classify the different types of Lightning arresters?
14. What are the major causes of over voltage

15. What is meant by formative time lag?
16. What is meant by Critical flash over voltage (CFO)?
17. What is meant by Statistical switching overvoltage?
18. Define insulation level
19. Define Protection ratio?
20. What is meant by surge arrester?
21. What is meant by surge diverter?
22. What are the requirements of surge diverter?

PART-B

1. Give the mathematical models for lightning discharges and explain them. (16)
2. Describe the characteristics of surge arresters? (8)
3. Explain the insulation co-ordination of overvoltage protective devices. (8)
4. Coordination between insulation and protective level ? (8)
5. Explain the operation of gas insulated substation? (8)
6. Explain the different aspects of insulation design and insulation co-ordination adopted for EHV systems? (16)
7. Write a detailed technical note on the following:
 - (i) Principle of digital computation
 - (ii) Application of z transforms. (8+8)
8. Why surge occur in motor and generator? Explain the response of motor and generator for surge condition. (16)
9. Explain the Classification of over voltages ? (16)
10. Explain Insulations for insulation co-ordination ? (16)
11. What are the applications of insulation co-ordination and explain it? (8)
12. How the arresters is located in insulation co-ordination ? (8)
13. Explain the Characteristics of protective devices ? (16)
14. Explain Insulation co- ordination in AIS ? (16)
15. Explain Insulation co- ordination in GIS ? (16)
16. Describe the principle of insulated co-ordination? (8)

UNIT-V **PART-A**

1. Why Digital Computation is required to analyses power system transients?
2. Mention any two advantages of EMTP software package?
3. How do you classify the insulation levels in Indian standards?

4. Define Creepage distance?
5. What is meant by standing waves
6. What is meant by TNA?
7. What are problems in TNA?
8. What is meant by reflection coefficient
9. What is meant by refraction coefficient
10. What are the requirements to modeling transmission line
11. What are the requirements to modeling the generator
12. What are the advantages of Digital computer to analyse to transient response
13. What are the advantages of TNA
14. What are the assumptions to analyse by EMTP the transmission line with open end
15. What are the assumptions to analyse by EMTP the transmission line with short end

PART-B

1. Explain the need for simulation studies. Also describe the key points of EMTP software and the steps involved to do a simulation study of a sample power system. (16)
2. Explain the operation of gas insulated substation? (8)
3. What is the basic principal of digital computation of power system transients? Also write down the steps involved to obtain solution of power system transients by using modal analysis method? (16)
4. Discuss the behavior of rotating machine winding subjected to various transient condition (16)
5. Explain transient modeling of transmission line (16)
6. Explain transient modeling of transformer (16)
7. Explain transient modeling of cables (16)
8. Explain transient modeling of rotating machines (16)
9. Explain transient model of transmission line with short and open end using EMTP
10. Explain transient model of transmission line ended with R,L &C?