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Question Paper Code : 81277

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2025.

Fifth/Sixth/Seventh/Eighth Semester

Electrical and Electronics Engineering

EE 3037 — POWER SYSTEM TRANSIENTS

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. Define transient recovery voltage.
2. Write the need for power system transients in power system planning.
3. Mention the need for resistance switching.
4. Differentiate the terms current suppression and current chopping.
5. List out the important characteristics of the lightning stroke.
6. Mention the factors contributing good line design.
7. List out the damages caused by the travelling waves.
8. Define standing wave ratio.
9. Define kilometric fault.
10. Identify any two advantages of EMTP software package.

PART B — ($5 \times 13 = 65$ marks)

11. (a) Discuss the internal and external causes and effects of transients on power systems.

Or

- (b) Explain the switching transient of RL circuit with sine wave excitation. Also, obtain the transient current component $i(t)$ for RLC circuit with sine wave excitation.

12. (a) Differentiate normal and abnormal switching transients in load switching.

Or

- (b) With neat sketch, explain the capacitance switching with multiple restrikes.

13. (a) With neat sketches, explain the two different theories of charge formation in the clouds.

Or

- (b) Derive an expression for the mathematical model for lightning.

14. (a) Discuss the phenomenon of current interruption in a lumped capacitive circuit and a distributed constant transmission line.

Or

- (b) Write down the algorithm for computation of over voltages using EMTP.

15. (a) Examine the switching surges in a power system and explain the concept of line dropping and load rejection in power system.

Or

- (b) Explain in detail about the switching surges on integrated power system.

PART C — (1 × 15 = 15 marks)

16. (a) With neat diagrams, discuss the behaviour of a travelling wave when it reaches the end of (i) open circuited transmission line (ii) short circuited transmission line.

Or

- (b) (i) A long transmission line is energized by a unit step voltage 1.0 V at the sending end and is open circuited at the receiving end. Develop the Bewley's Lattice diagram and obtain the value of the voltage at the receiving end after a long time. Take the attenuation factor $\alpha = 0.85$. (7)
- (ii) Draw the step response of a travelling wave. Explain it by using Bewley's lattice diagram. (8)