Reg. No. : | | | | | | | | | | |

Question Paper Code: 49309

B.E./B.Tech. DEGREE EXAMINATION, NOV 2018

Elective

Electrical and Electronics Engineering

14UEE909 – POWER SYSTEM TRANSIENTS

(Regulation 2014)

Duration: Three hours Maximum: 100 Marks

PART A - (10 x 1 = 10 Marks)

1. The over-voltage surges in power systems may be caused by CO1-R

   (a) lightning (b) switching
   (c) resonance (d) any of the above.

2. Externally generated transients include CO1-R

   (a) Lightning (b) Power supplies (c) Electronic ballasts (d) Inverters

3. Switching overvoltage in power system networks are of the order of CO2-R

   (a) 1.5 p.u. (b) 2.5 to 3.5 p.u.
   (c) 1.0 p.u. or more (d) 2 p.u

4. When the multiple restriking occurs, possibility of voltage developed across the switch is_____ CO2-R

   (a) 1 p.u (b) 2 p.u (c) 3 p.u (d) 4 p.u

5. The time duration of a dart leader in a lightning stroke is CO3-R

   (a) 1 ms (b) 40 ms (c) 10 ms (d) 20 ms

6. Protection against lightning in HV lines requires the tower footing resistance in the order of CO3-R

   (a) 5 ohms (b) 10 ohms (c) 15 ohms (d) 20 ohms

7. A 10 km long transmission cable has total inductance of $100\mu H$ and capacitance of $0.25\mu F$. Find out the characteristics impedance (ohm) of the cable1. CO4-R

   (a) 20 (b) 0.05 (c) 400 (d) 40

8. The propogation of travelling waves along the transmission line has the effect of CO4-R

(a) attenuation (b) increase in magnitude
(c) distortion (d) both attenuation and distortion

9. Most suitable numeric method to solve electrostatic field problems is CO5-R

(a) Laplace Equation Method (b) Charge simulation method
(c) Finite difference method (d) Resistance Analog method

10. The condition which causes over frequency is CO5-R

(a) line dropping (b) load rejection (c) switching (d) transients

PART – B (5 x 2= 10Marks)

11. Categorize the power system transients with respect to time duration. CO1-R

12. Define current choppping CO2-R

13. Mention the significance of tower footing resistance. CO3-R

14. Summarize the difference between travelling waves and standing waves. CO4-R

15. What is meant by kilometric fault? CO5-R

PART – C (5 x 16= 80Marks)

16. (a) Illustrate the significance of double frequency transients with necessary circuit derivations CO1- U (16)

Or

(b) Discuss the significance of study of transients in system planning. CO1- U (16)

17. (a) Analyze the resistance switching and find out the critical value of shunt resistance to obtain complete damping of transient oscillations. Also sketch the equivalent circuit for the resistance switching. CO2- U (16)

Or

(b) With necessary waveforms explain with a restrike, with multiple restrikes capacitive switching. CO2- U (16)

18. (a) Investigate the mechanism of lightning phenomenon and also interpret about the stepped leader. CO3-Ana (16)

Or

	(b)	With a neat diagram explain the protection offered by ground wires.	CO3- Ana	(16)
19.	(a)	A long transmission line is energized by a unit step voltage 1.0V 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 $\alpha = 0.8$	CO4- App	(16)

Or

	(b)	Derive the reflection and refraction coefficient of a travelling wave with necessary diagrams.	CO4- App	(16)
20.	(a)	Discuss in detail the performance of kilometric fault in power systems with necessary diagrams, expressions and voltage and recovery voltage wave forms	CO5- U	(16)

Or

	(b)	(i) Explain the causes of transients on closing and reclosing of transmission line.	CO5- U	(8)
		(ii) Discuss in detail about line dropping and load rejection in integrated power system.	CO5- U	(8)