Reg. No. :

Question Paper Code: 49309

B.E./B.Tech. DEGREE EXAMINATION, APRIL 2019

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. _____ is the study of the power system, following a major disturbance such as loss in power generation, line outage etc.　　CO1-R

    (a) Transient stability   (b) Steady state stability

    (c) Voltage stability   (d) Angle stability

2. Externally generated transients include　　CO1-R

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

3. To reduce rate of rise of restriking voltage and severity of voltage oscillations, a resistance is connected across the contacts of the circuit breaker is known　　CO2-R

    (a) Resistance connecting   (b) Resistance contacting

    (c) Resistance switching   (d) None of the above

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. Lightning is a _____ phenomena.　　CO3-R

    (a) Artificial   (b) Natural   (c) Induced   (d) Diffused

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. Waves that are trapped in one spot are called _____   CO4-R

   (a) Standing waves   (b) Travelling waves

   (c) Distorted waves   (d) None of the above

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. Due to fault, the load connected in the system is disconnected, which is called as _____   CO5-R

   (a) Load rejection   (b) System fault   (c) Load addition   (d) None of the above

PART – B (5 x 2= 10Marks)

11. List the different types of power system transients?   CO1-R

12. Draw the characteristic curve of capacitance switching with single and multiple restrikes.   CO2-R

13. Explain Stroke A and Stroke B type of lightning.   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) Brief about RL circuit transient with sine wave excitation   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) (i) Explain in detail about ferroresonance with relevant diagram   CO2- U   (8)

   (ii) Illustrate multiple restriking transients with a neat waveform.   CO2- U   (8)

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

    Or

    (b) Elaborate various theories in the formation of clouds and charge formation.   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) Brief about reflection and refraction of travelling waves   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) Describe the computation procedure of EMTP for electromagnetic transients with neat flowchart   CO5- U   (16)

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