Reg. No.																

Question Paper Code	14573

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2026

Sixth Semester

Electrical and Electronics Engineering

20EEEL601 - POWER SYSTEM TRANSIENTS

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART – A (i) (MCQ)
(16 × 1 = 16 Marks)
Answer ALL Questions

		Marks	K – Level	CO
1.	------- the primary cause of power system transients and surges a) Earthquakes b) Switching and Lightning c) Solar flares d) Tornadoes	1	K1	CO1
2.	In the switching transient analysis DC component is known as _____ a) Steady state component b) Force free component c) Both of the mentioned d) None of the mentioned	1	K2	CO1
3.	Lightning surges in power systems are categorized as _____ transients a) Mechanical b) Thermal c) Chemical d) Electromagnetic	1	K3	CO1
4.	The switching surges are due to a) Opening of unloaded line b) Opening of loaded line c) Current chopping d) All of the above	1	K1	CO2
5.	In circuit breaker, current chopping is associated with _____ a) Resistance switching b) Small inductive current c) Small capacitive current d) Heavy short circuit current	1	K2	CO2
6.	Abnormal switching transients are mainly caused by _____ operation of circuit breakers. a) Proper b) Repeated re-striking c) Delayed d) Balanced	1	K3	CO2
7.	The wave form of lightning is ------ a) Sine b) Cosine c) Impulse d) Square	1	K1	CO3
8.	— is the rise time of 1 / 50 µsec transient voltage a) 50 µsec b) 25 µsec c) 10 µsec d) 1 µsec	1	K2	CO3
9.	-------is the typical value of tower footing resistance for 66 kV lines a) 5 Ohm b) 10 Ohm c) 30 Ohm d) 80 Ohm	1	K3	CO3
10.	The angle of propagation in Bewley Lattice Diagram represents the _____ of the traveling wave a) Frequency b) velocity c) impedance d) Wavelength	1	K1	CO4

11.	For distortion less transmission line		1	K2	CO4
	a) RL = GC	b) RG = LC			
	c) RC = GL	d) RLGC = 0			
12.	Standing waves don't go anywhere, but they do have regions where the disturbance of the wave is quite small, almost zero. These locations are called _____		1	K3	CO4
	a) Nodes	b) Antinodes			
	c) Troughs	d) Crest			
13.	When a no load transmission line is suddenly switched on, the voltage on the line becomes _____ of normal system voltage.		1	K1	CO5
	a) Same	b) Twice			
	c) Thrice	d) Zero			
14.	The effect of transient on a specific load will depend on the level of _____ that load		1	K2	CO5
	a) Impedance	b) Admittance			
	c) Susceptibility	d) Resistance			
15.	Reclosing of transmission lines after a fault can produce		1	K3	CO5
	a) Steady DC voltage	b) High-frequency switching surges			
	c) Reduction in charging current	d) Zero transient current			
16.	The qualitative application of EMTP helps engineers to		1	K3	CO5
	a) Predict transient behavior in networks	b) Reduce conductor weight			
	c) Increase turbine speed	d) Eliminate transmission losses			

PART – A (ii) (Short Answer Questions)
(8 × 3 = 24 Marks)
Answer ALL Questions

17.	Derive the relation between time constant of parallel and series circuit.	3	K3	CO1
18.	Compare lightning over voltage and switching over voltage.	3	K4	CO1
19.	Derive the critical resistance value of resistance switching.	3	K3	CO2
20.	Infer the effect of Ferro resonance in power system.	3	K4	CO2
21.	Outline the theories that are related to the cloud formation and charge accumulation.	3	K3	CO3
22.	Illustrate the formation of standing waves and define natural frequency.	3	K3	CO4
23.	Overhead line with surge impedance of 50Ω is connected to a cable having a surge. Impedance of 600Ω. Infer the transmission coefficient into the cable.	3	K4	CO4
24.	Interpret the protective methods used to control the load rejection effects.	3	K3	CO5

PART - B (Descriptive Answer Questions)
(5 × 12 = 60 Marks)
Answer ALL Questions

25.	a)	Examine the switching transients of RL circuit with sine wave excitation and interpret the nature of damping.	12	K4	CO1
		OR			
	b)	Analyze the various sources of power system transients and examine their effects on power system performance with suitable examples.	12	K4	CO1
26.	a)	Illustrate and apply the principles of load switching under abnormal conditions with neat sketches.	12	K3	CO2
		OR			
	b)	Demonstrate the effects of source regulation and capacitance switching with re-strike.	12	K3	CO2

27.	a)	Identify the stages involved in the mechanism of lightning strokes with neat sketches.	*12*	*K3*	*CO3*
		OR			
	b)	How would you apply different methods to protect a transmission line and tower from lightning over voltages in a practical power system?	*12*	*K3*	*CO3*
28.	a)	Infer the expression for reflection and transmission wave voltage. (a) When it is short circuited at the receiving end. (b) Line is terminated with a resistance equal to the surge impedance of the line. (c) When infinitely long line is open circuited at the receiving end.	*12*	*K4*	*CO4*
		OR			
	b)	Analyze in detail about the procedure of Bewley's Lattice diagram.	*12*	*K4*	*CO4*
29.	a)	Analyze switching surges in an integrated system and identify the factors influencing their severity.	*12*	*K3*	*CO5*
		OR			
	b)	Identify the effects of short line faults in a power system and interpret the resulting transient current and voltage behavior.	*12*	*K3*	*CO5*