Register No : _____

THE KAVERY ENGINEERING COLLEGE

(An Autonomous Institution)

B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, NOV/DEC 2025

Fifth Semester

Electrical and Electronics Engineering

EE3501 – Power System Analysis

Regulations - 2021

Duration : 3 Hrs *Maximum : 100 Marks*

*PART – A (ANSWER ALL QUESTIONS) (Marks 10*2=20)*

Q.No	*Questions*	*BTL*	*CO*	*Marks*
1.	List the benefits of single line diagram.	L1	1	2
2.	Outline the approximations made while forming impedance diagram.	L2	1	2
3.	Identify the known and unknown quantities of PQ and PV bus.	L1	2	2
4.	Compare the Gauss-Seidel and Newton-Raphson method of load flow analysis.	L2	2	2
5.	Interpret the assumptions made in short circuit analysis.	L2	3	2
6.	Mention the need for current limiting reactor.	L1	3	2
7.	Draw the connection of sequence networks for a single line-to-ground fault at the terminals of an unloaded generator.	L1	4	2
8.	Express unbalanced phase currents in a 3-phase system in terms of symmetrical component.	L2	4	2
9.	How to improve the transient stability limit of the power system?	L1	5	2
10.	Define critical clearing angle.	L1	5	2

*PART – B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)*

Q.No		*Questions*	*BLT*	*CO*	*Marks*
11.	a	Examine the various Power system components and its representation in detail.	L2	1	16
		Or			
	b	Explain the algorithm for computing bus admittance matrix using singular transformation.	L2	1	16
12.	a	Derive the basic equations for the load flow study using Gauss-Seidel method. With respect to this method, explain the following: (i) Acceleration factor (ii) Handling of PV buses	L2	2	16
		Or			
	b	Draw the flow chart for the solution of power flow analysis using Newton-Raphson method.	L2	2	16

13.	a	A synchronous generator and motor are rated for 30,000 kVA, 13.2 kV and both have sub transient reactance of 20%. The line connecting them has a reactance of 10% on the base of machine ratings. The motor is drawing 20,000 kW at 0.8 pf leading. The terminal voltage of the motor is 12.8 kV. When a symmetrical three-phase fault occurs at motor terminals, find the sub transient current in generator, motor and at the fault point.	L2	3	16
		Or			
	b	A 3-phase transmission line operating at 33 kV and having resistance and reactance of 5 ohms and 15 ohms respectively is connected to the generating station busbar through a 5000 kVA step up transformer which has a reactance of 0.05 p.u. Connected to the busbars are two alternators, are 10,000 kVA having 0.08 p.u, reactance and another 5000 kVA having 0.06 p.u. reactance. Calculate the kVA at a short circuit fault between phases occurring at the high voltage terminals of the transformers.	L2	3	16
14.	a	Develop the fault current and draw its sequence network diagram of an unloaded generator during double line-to-ground fault condition.	L2	4	16
		Or			
	b	Derive an expression for the positive sequence current I_a of an unloaded generator when it is subjected to a line-to-line fault.	L2	4	16
15.	a	Construct the Swing equation used for stability studies in power system.	L2	5	16
		Or			
	b	Explain the modified Euler method of analyzing multi machine power system for stability with neat flow chart.	L2	5	16