Register No : _____

THE KAVERY ENGINEERING COLLEGE

(An Autonomous Institution)

M.E DEGREE END SEMESTER THEORY EXAMINATIONS, NOV /DEC 2024

First Semester

Power Systems Engineering

PPST2412 / PS4102 - Power System Operation and Control

Regulations – 2021 & 2024

Duration : 3 Hrs *Maximum : 100 Marks*

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

Q.No	*Questions*	*BLT*	*CO*	*Marks*
1.	List the different types of load curves used to assess the system load characteristics.	RE	1	2
2.	Explain the significance of the diversity factor in power system operation.	UN	1	2
3.	Define Load Frequency Control (LFC) in a power system.	RE	2	2
4.	Illustrate the need for both frequency and voltage control in power systems.	UN	2	2
5.	What is the purpose of hydrothermal coordination in power systems?	RE	3	2
6.	Compare short-term and long-term hydrothermal scheduling.	UN	3	2
7.	Name two main constraints in the Unit Commitment (UC) problem.	RE	4	2
8.	Compare the priority-list method and the forward dynamic programming approach used in unit commitment.	UN	4	2
9.	Recall the need for power system security in operation.	RE	5	2
10.	Infer the purpose of contingency analysis in power system security.	UN	5	2

PART – B (ANSWER ALL QUESTIONS) (Marks 5*13 = 65)

Q.No		Questions	*BLT*	*CO*	*Marks*
11.	a	Explain the importance of load forecasting in power system operation and the techniques used.	UN	1	13
		Or			
	b	Demonstrate the recent growth and evolution of the Indian power sector and its impact on system operation.	UN	1	13
12.	a	Interpret the modeling process of load frequency control for a single-area system and its static analysis.	UN	2	13
		Or			
	b	Explain tie-line bias control in a two-area LFC system with an example.	UN	2	13
13.	a	Analyze the gradient approach to solve a hydrothermal scheduling problem for a system with hydro units in series.	AP	3	13
		Or			
	b	Describe the dynamic programming for scheduling a system with pumped hydro plants	AP	3	13
14.	a	Construct a solution for an economic dispatch problem using the λ-iteration method.	AP	4	13
		Or			
	b	Apply a priority list for unit commitment considering spinning reserve and thermal unit constraints.	AP	4	13

15.	a		Identify a security-constrained optimal power flow study using the interior point algorithm.	AP	5	13
			Or			
	b		Analyze the contingency analysis process using linear sensitivity factors for power system security.	AP	5	13

PART – C (Marks 1*15 = 15)

Q.No			Questions	*BLT*	*CO*	*Marks*
16.	a	i	Apply load forecasting techniques to develop a load curve and predict system load variations over a specified time frame.	AP	1	8
		ii	Experiment with the development of a state variable model for a two-area LFC system, detailing each step of the process.	AP	2	7
			Or			
	b	i	Interpret a short-term scheduling model for a hydrothermal system using linear programming, and discuss its effectiveness.	AP	3	8
		ii	Solve an economic dispatch problem using Newton's method, and explain the steps involved.	AP	4	7