K. K. Wagh Institute of Engineering Education & Research, Nashik

(An Autonomous Institute From A.Y. 2022-23)

InSem Examination-I Winter2025	
Exam Seat No.:	
Academic Year: 2025-2026	Semester: I
Class: PG-I	Program: M. Tech
Branch Code: ELE	Pattern: 2024
Name of Course: Power System Dynamics	Course Code: 2406502
Max. Marks: 30	Duration: 1.15 Hrs.

Instructions: Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.

1. This question paper contains 1 page(s).
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required but justify it.
4. Draw the neat, labelled diagrams, wherever necessary.
5. The last columns indicate the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.

		Marks	CO
Question No. 1			
1 a)	Distinguish between steady-state stability and transient stability in power systems. How are these analyzed?	(7)	CO1
Question No. 2			
2 a)	A generator operating at 50 Hz delivers 1 pu power to an infinite bus through a transmission circuit in which resistance is ignored. A fault takes place reducing the maximum power transferable to 0.5 pu whereas before the fault, this power was 2.0 pu and after the clearance of the fault, it is 1.5 pu. By the use of equal area criterion, determine the critical clearing angle.	(8)	CO1
	OR		
2 b)	A 3-ph alternator having E=1.2 pu, X'd=0.2 pu delivers 1.5 pu power to infinite bus with V=1 pu through the two parallel transmission lines having reactance X1= X2=0.4 pu. If 3–ph fault takes place at middle point of second line, find critical clearing angle	(8)	CO1
Question No. 3			
3 a)	Define Park's transformation and discuss its importance in modelling synchronous machines.	(7)	CO2
Question No. 4			
4 a)	Explain the significance of the flux linkage equation in the modelling of a synchronous machine. Derive the flux linkage equation and discuss how it helps in representing the dynamic behavior of the machine.	(8)	CO2
	OR		
4 b)	Explain the torque equation used in the modelling of a synchronous machine. Derive the expression for electromagnetic torque and discuss its significance in analyzing the machine's dynamic behavior.	(8)	CO2

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