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VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 80023

M.E. / M.Tech. DEGREE END-SEMESTER EXAMINATIONS – JAN. 2025

Third Semester

Power Systems Engineering

P23PSE20 – FACTS

(Regulation 2023)

Time : Three Hours

Maximum : 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Justify the necessity of transmission interconnections.	2	K2	CO1
2.	Identify the various types of FACTS controllers installed and operative in India with their locations.	2	K1	CO1
3.	Define midpoint voltage regulation of line segmentation.	2	K1	CO2
4.	Outline the significance of reactive power biasing.	2	K2	CO2
5.	Identify the parameters to control by series compensators.	2	K3	CO3
6.	Tell the objectives of load compensation?	2	K1	CO3
7.	List the major benefits of phase angle regulator.	2	K1	CO4
8.	Identify the voltage control by tap changing transformer and thyristor switches.	2	K3	CO4
9.	Identify the controls parameters by UPFC.	2	K3	CO5
10.	Illustrate the impact of sub synchronous resonance on power system components.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q. No.	Questions	Marks	KL	CO
11. a)	Explain the various parameters which limit the loading capabilities of transmission line in the power system.	13	K2	CO1

		(OR)			
	b)	Examine the behavior of FACTS controllers during dynamic stability scenarios in the power system with suitable example.	13	K4	CO1
12.	a)	i. Recall the objective of shunt compensation.	3	K1	CO2
		ii. Experiment the VAR generation scheme using Static Synchronous Compensator (STATCOM) with supporting mathematical equations and neat diagram.	10	K3	CO2
		(OR)			
	b)	Explain the VAR compensation scheme using TCR and TSC with neat sketch and supporting mathematical equations.	13	K2	CO2
13.	a)	i. Recall the objective of series compensation [03]	13	K1	CO3
		ii. Explain the power transfer capability using Static Synchronous Series Compensator (SSSC) with equations and neat diagram. [10]		K2	
		(OR)			
	b)	Illustrate the power transfer capability using TSSC and TCSC with neat sketch and mathematical equations.	13	K2	CO3
14.	a)	In detail explain the necessity and application of phase angle regulator in the modern power system with suitable example.	13	K2	CO4
		(OR)			
	b)	Develop a systematic procedure to utilize the online tap changing three phase transformer as phase angle regulator.	13	K3	CO4
15.	a)	In detail explain the control strategy of UPFC to control active and reactive power simultaneous in the power system.	13	K2	CO5
		(OR)			
	b)	Identify the sources of sub synchronous resonance in the power system and suggest the solutions to mitigate the impact of sub synchronous resonance on power system components.	13	K3	CO5

PART – C

(1 x 15 = 15 Marks)

Q. No.	Questions	Marks	KL	CO
16. a)	Develop the control scheme using thyristor controlled braking resistor (TCBR) to improve the transient stability of the large interconnected power system.	15	K3	CO2
		(OR)		
b)	Develop a dynamic voltage restorer with systematic control scheme to improve the power quality of power system voltage waveforms at each substation.	15	K3	CO4