Code No: R**204102C** **R20** **Set No. 1**

IV B.Tech I Semester Regular Examinations, January – 2024

FLEXIBLE ALTERNATING CURRENT TRANSMISSION SYSTEMS

(Electrical & Electronics Engineering)

Time: 3 hours **Max. Marks: 70**

Answer any FIVE Questions
ONE Question from Each unit
All Questions Carry Equal Marks

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UNIT - I

1	a)	Explain why we need Transmission Interconnections.	[7]
	b)	Describe the power flow in meshed system with necessary diagrams.	[7]
		(OR)	
2		Discuss the relative importance of different types of FACTS controllers.	[14]

UNIT - II

3	a)	Explain the single phase-leg operation with circuit diagram and waveform.	[7]
	b)	Obtain the square-wave voltage harmonics for a single-phase bridge.	[7]
		(OR)	
4	a)	Discuss about three principal types of current-sourced converters.	[7]
	b)	Differentiate the advantages and disadvantages of current-sourced versus voltage-sourced converters.	[7]

UNIT - III

5		Elaborately explain the midpoint voltage regulation for line segmentation with circuit diagrams and expressions.	[14]
		(OR)	
6	a)	Briefly discuss the basic operating principles of switching converter type VAR generators.	[7]
	b)	Distinguish various differences between SVC and STATCOM.	[7]

UNIT - IV

7	a)	Explain the objectives of series compensation.	[7]
	b)	Discuss how voltage stability improves with static series compensation.	[7]
		(OR)	
8		Briefly discuss about the static synchronous series compensator along with its necessary diagrams and expressions.	[14]

UNIT - V

9		Explain the principled operation of unified power flow controller with necessary diagrams.	[14]
		(OR)	
10		Describe the control structure of IPFC with necessary diagrams.	[14]

Code No: R**204102C** **R20** **Set No. 2**

IV B.Tech I Semester Regular Examinations, January – 2024

FLEXIBLE ALTERNATING CURRENT TRANSMISSION SYSTEMS

(Electrical & Electronics Engineering)

Time: 3 hours **Max. Marks: 70**

Answer any FIVE Questions
ONE Question from Each unit
All Questions Carry Equal Marks

*****

UNIT - I

1	a)	Explain the power flow in parallel paths with necessary diagrams.	[7]
	b)	Discuss about the loading capability limits of transmission system.	[7]
		(OR)	
2		Describe about the losses and speed of switching in transmission system.	[14]

UNIT - II

3	a)	Explain the operation of single-phase full-wave bridge converter.	[7]
	b)	Obtain the fundamental and harmonics for a three-phase bridge converter.	[7]
		(OR)	
4		Discuss briefly about three phase current source converter along with its circuit diagrams and waveforms.	[14]

UNIT - III

5		Elaborately explain the improvement of transient stability using shunt compensation along with its circuit diagrams.	[14]
		(OR)	
6		Describe about the thyristor-switched capacitor, thyristor-controlled reactor type VAR generator with necessary diagrams.	[14]

UNIT - IV

7		Explain the concept of series capacitive compensation with necessary diagrams and expressions.	[14]
		(OR)	
8	a)	Discuss the transmitted power versus transmission angle characteristic of SSSC.	[7]
	b)	What is the basic operating control scheme for GCSC, TSSC, and TCSC?	[7]

UNIT - V

9		Explain the conventional transmission control capabilities of unified power flow controller with necessary diagrams.	[14]
		(OR)	
10		Briefly discuss about the basic operating principles and characteristics of IPFC with necessary diagrams.	[14]

Code No: R**204102C** **R20** **Set No. 3**

IV B.Tech I Semester Regular Examinations, January – 2024

FLEXIBLE ALTERNATING CURRENT TRANSMISSION SYSTEMS

(Electrical & Electronics Engineering)

Time: 3 hours **Max. Marks: 70**

Answer any FIVE Questions

ONE Question from Each unit

All Questions Carry Equal Marks

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UNIT - I

1 Explain the power flow and dynamic stability considerations of a transmission interconnection with necessary diagrams. [14]

(OR)

2 a) Explain about the parameter trade-off of devices. [7]

b) Discuss about the benefits from FACTS controllers. [7]

UNIT - II

3 a) Explain the basic concept of voltage sourced converter. [7]

b) Discuss the single-phase full-wave bridge converter operation. [7]

(OR)

4 Briefly discuss about the converter operation of three-phase full-wave bridge converter with circuit diagram and waveforms. [14]

UNIT - III

5 a) Discuss power oscillation damping using shunt compensation with waveforms [7]

b) Consolidate the summary of compensator requirements. [7]

(OR)

6 Elaborately explain about the fixed capacitor, thyristor-controlled reactor type VAr generator with necessary diagrams. [14]

UNIT - IV

7 a) Discuss how improvement of transient stability using series compensation was performed. [7]

b) What is the summary of functional requirements of series compensation? [7]

(OR)

8 Briefly discuss about the thyristor-controlled series capacitor with necessary diagrams and expressions. [14]

UNIT - V

9 Describe the importance of independent real and reactive power flow control of UPFC with necessary diagrams. [14]

(OR)

10 Explain the basic operating principles and characteristics of IPFC with necessary diagrams. [14]

Code No: R**204102C** **R20** **Set No. 4**

IV B.Tech I Semester Regular Examinations, January – 2024

FLEXIBLE ALTERNATING CURRENT TRANSMISSION SYSTEMS

(Electrical & Electronics Engineering)

Time: 3 hours **Max. Marks: 70**

Answer any FIVE Questions
ONE Question from Each unit
All Questions Carry Equal Marks
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UNIT - I

1	a)	Explain the relative importance of controllable parameters.	[7]
	b)	What are the basic types of facts controllers? Discuss briefly.	[7]
		(OR)	
2		Briefly describe about the voltage and current rating of high-power device characteristics.	[14]

UNIT - II

3		Explain the transformer connections for 12-pulse operation with circuit diagram and waveforms.	[14]
		(OR)	
4	a)	Discuss the basic concept of current-sourced converters with neat circuit diagrams.	[7]
	b)	Compare current-sourced versus voltage-sourced converters.	[7]

UNIT - III

5	a)	What are the objectives of shunt compensation?	[7]
	b)	Explain the end of line voltage support to prevent voltage instability.	[7]
		(OR)	
6		Describe the thyristor-controlled and thyristor-switched reactor with necessary diagrams.	[14]

UNIT - IV

7	a)	Discuss how improve the power oscillation damping using series compensation.	[7]
	b)	What are the various approaches to controllable series compensation?	[7]
		(OR)	
8		Explain the thyristor-switched series capacitor with necessary diagrams and expressions.	[14]

UNIT - V

9		Discuss about the basic operating principles of unified power flow controller with necessary schematic diagrams.	[14]
		(OR)	
10		Explain about the control applications of transmission lines.	[14]