Code No:**R164202B** **R16** **Set No. 1**

IV B.Tech II Semester Regular Examinations, September - 2020

FLEXIBLE ALTERNATING CURRENT TRANSMISSION SYSTEMS

(Electrical and Electronics Engineering)

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

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any FOUR questions from Part-B
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PART–A *(14 Marks)*

1.	a)	List out the importance of controllable parameters.	[3]
	b)	What are the principal types of current sourced converters?	[2]
	c)	How do you improve the transient stability using shunt compensation?	[3]
	d)	What are the methods of controlling the reactive power?	[2]
	e)	What are the various types of variable impedance type series compensators?	[2]
	f)	Why you need UPFC.	[2]

PART–B *(4x14 = 56 Marks)*

2.	a)	Explain the dynamic stability considerations of a transmission interconnections.	[7]
	b)	Describe the possible benefits from FACTS technology.	[7]
3.	a)	Discuss the basic concept of voltage source converter.	[7]
	b)	Explain the operation of three phase bridge converter with diagrams.	[7]
4.		Explain the mid–point voltage regulation for line segmentation with necessary diagrams and expressions.	[14]
5.	a)	Explain the regulation slope of static VAr generator with block diagram.	[7]
	b)	Describe the VAr reserve control of static compensator.	[7]
6.	a)	Discuss the concept of series capacitive compensation with necessary expressions.	[7]
	b)	What is the summary of functional requirements of series compensation?	[7]
7.		Explain the basic operating principle of UPFC with diagrams.	[14]

Code No:**R164202B** **R16** **Set No. 2**

IV B.Tech II Semester Regular Examinations, September - 2020

FLEXIBLE ALTERNATING CURRENT TRANSMISSION SYSTEMS

(Electrical and Electronics Engineering)

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

Question paper consists of Part-A and Part-B

Answer ALL sub questions from Part-A

Answer any FOUR questions from Part-B

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PART–A *(14 Marks)*

1.	a)	What are the basic types of FACTS controllers?	[2]
	b)	What is the basic concept of voltage source converter?	[3]
	c)	What is the need ofend of line voltage support to prevent voltage instability?	[3]
	d)	What is meant by thyristor switched capacitor?	[2]
	e)	What is meant by thyristor controlled series capacitor?	[2]
	f)	What is meant by UPFC?Draw its diagram.	[2]

PART–B *(4x14 = 56 Marks)*

2.	a)	What limits loading capability in AC power transmission system. Discuss them.	[7]
	b)	Explain the losses and speed of switching of high power devices.	[7]
3.	a)	Discuss the operation of single phase full wave bridge converter.	[7]
	b)	Derive the expressions for fundamental and harmonic voltages for a three phase bridge converter.	[7]
4.		Describe the improvement of transient stability using shunt compensation with necessary diagrams.	[14]
5.	a)	Compare the different types of static VAr generators.	[7]
	b)	Derive the transfer function of SVC and STATCOM.	[7]
6.		Describe the thyristor switched series capacitor with neat diagrams and expressions.	[14]
7.		Explain the conventional transmission control capabilities of UPFC with diagrams and expressions.	[14]

Code No:**R164202B** **R16** **Set No. 3**

IV B.Tech II Semester Regular Examinations, September - 2020

FLEXIBLE ALTERNATING CURRENT TRANSMISSION SYSTEMS

(Electrical and Electronics Engineering)

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

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any FOUR questions from Part-B
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PART–A *(14 Marks)*

1.	a)	What are the benefits fromFACTS controllers?	[3]
	b)	What are the basic categories of self-commutating converters?	[2]
	c)	What are the objectives of shunt compensation?	[3]
	d)	What are the functions provided by the control scheme of TSC-TCR type VAr generator?	[2]
	e)	What is meant by thyristor switched series capacitor? Draw its diagram.	[2]
	f)	What is the need of UPFC?	[2]

PART–B *(4x14 = 56 Marks)*

2.	a)	What are the opportunities of FACTS? How they are fulfilled in AC power transmission?	[7]
	b)	What are the basic types of FACTS controllers? Discuss them with neat diagrams.	[7]
3.	a)	How do you determine dominant harmonics in the square wave output voltage of a single phase inverter?	[7]
	b)	What are the merits and demerits of current source verses voltage source converters?	[7]
4.	a)	Explain the power oscillation damping with shunt compensation.	[7]
	b)	What is the summary of shunt compensator requirements?	[7]
5.		Describe the TSC–TCR type VAr generator with necessary diagrams.	[14]
6.	a)	Explain the improvement oftransient stability using static series compensator.	[7]
	b)	Briefly discuss the GTO thyristors controlled series capacitor.	[7]
7.		Explain the independent real and reactive power flow control of UPFC with diagrams.	[14]

Code No:**R164202**B **R16** **Set No. 4**

IV B.Tech II Semester Regular Examinations, September - 2020

FLEXIBLE ALTERNATING CURRENT TRANSMISSION SYSTEMS

(Electrical and Electronics Engineering)

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

Question paper consists of Part-A and Part-B

Answer ALL sub questions from Part-A

Answer any FOUR questions from Part-B

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PART–A *(14 Marks)*

1. a) What are the various types of high power thyristor devices? [2]
   b) What is the primary difference between current source converterand voltage source converter? [3]
   c) What is the need of mid–point voltage regulation for line segmentation? [3]
   d) What is meant by STATCOM? Draw its diagram. [2]
   e) What are the objectives of series compensation? [2]
   f) Draw the circuit diagram of UPFC. [2]

PART–B *(4x14 = 56 Marks)*

2. a) Why we need transmission interconnections? [5]
   b) Illustrate the power flow in an AC System. [9]

3. a) Derive the expression for square wave voltage harmonics for single phase bridge. [7]
   b) Explain the operation of threephase current source converter. [7]

4. a) What are the objectives of shunt compensation? [5]
   b) Explain how you prevent voltage instability using end of line voltage support. [9]

5. a) Describe the thyristor switched capacitor with neat diagrams. [9]
   b) Compare SVC and STATCOM type of VAr generators. [5]

6. Describe the thyristor controlled series capacitor with neat diagrams and expressions. [14]

7. Compare the UPFC to controlled series compensators with necessary diagrams [14]