

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY GURAJADA VIZIANAGARAM**  
**IV B. Tech I Semester Regular/Supplementary Examinations OCT/NOV 2025**  
**FLEXIBLE ALTERNATING CURRENT TRANSMISSION SYSTEMS**

(EEE)

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 basic types of Flexible Alternating Current Transmission Systems (FACTS) controllers. [7M]  
b) Describe the procedure to locate the FACTS devices in an electrical network. [7M]  
(OR)
2. a) Explain the objectives of FACTS controllers in the power system network. [7M]  
b) What is the need for transmission interconnections? What limits the loading capability of transmission lines? Explain the power flow in ac systems. [7M]

**UNIT-II**

3. a) Explain the working principle of a single-phase full-wave bridge converter. [7M]  
b) What techniques are used to reduce harmonics in Voltage source converters? [7M]  
(OR)
4. a) Explain the key components required for implementing a Current Source Converter(CSC) and also mention the typical applications of CSCs in industrial systems. [7M]  
b) Compare the harmonic performance of CSCs and VSCs? [7M]

**UNIT-III**

5. a) Describe the midpoint voltage regulation for line segments with neat diagrams. [7M]  
b) Explain how to prevent voltage instability using shunt compensating at receiving end. [7M]  
(OR)
6. a) Explain the basic operating principle of switching converter type VAR generator. [7M]  
b) Discuss the switching converter with TSC and TCR? [7M]

**UNIT-IV**

7. a) What are the objectives of series compensator in detail? [7M]  
b) Explain the Thyristor – Controlled Series Capacitor. [7M]  
(OR)
8. a) Describe the Static Synchronous Series Compensator with circuit and phasor diagrams. [7M]  
b) Describe how static series compensation can improve the transient stability [7M]

**UNIT-V**

9. a) Explain the basic operating principles of UPFC with neat circuit diagram. [7M]  
b) Describe the basic control system for P and Q control in UPFC with the help of block diagrams. [7M]  
(OR)
10. a) Explain the working and Characteristics of Integrated power flow controller with neat sketch. [7M]  
b) Explain in detail about different control interactions in detail. [7M]

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