Code No: **R42027** **R10** **Set No. 1**

IV B.Tech II Semester Regular/Supplementary Examinations, April - 2015

FLEXIBLE ALTERNATING CURRENT TRANSMISSION SYSTEMS (FACTS)

(Electrical and Electronics Engineering)

Time: 3 hours **Max. Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks
*****

1. a) What is the need of transmission interconnection?
   b) Explain the importance of controllable parameters.

2. a) Discuss the benefits of FACTS controllers.
   b) Describe the parameters trade-off of high power devices.

3. a) Explain the operation of three phase full wave bridge converter with circuit diagram and waveforms.
   b) What are the merits and demerits of voltage source converter with compared to current source converter?

4. a) Illustrate the midpoint voltage regulation for line segment by using shunt compensation.
   b) List out the objectives of shunt compensation.

5. Explain the thyristor-switched capacitor, thyristor controlled reactor type VAr generator with circuit diagram and its characteristics.

6. Describe the transient stability enhancement and power oscillation damping with SVC and STATCOM with necessary diagrams.

7. a) List out the various types of variable impedance series compensators.
   b) Explain the thyristor controlled series capacitor with diagram and its characteristics.

8. Briefly discuss the UPFC with necessary diagrams and its characteristics.

Code No: **R42027** **R10** **Set No. 2**

IV B.Tech II Semester Regular/Supplementary Examinations, April - 2015

FLEXIBLE ALTERNATING CURRENT TRANSMISSION SYSTEMS (FACTS)

(Electrical and Electronics Engineering)

Time: 3 hours **Max. Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks
*****

1. a) Explain the power flow in parallel circuits with FACTS.
   b) What are the limits of the loading capability of lines? And only discuss with stability condition.

2. Briefly discuss the requirement and characteristics of high power devices.

3. a) What are the basic categories of self commutating converter? Discuss the voltage source converter.
   b) Explain the operation of single phase-leg or pole.

4. a) Discuss how to prevent voltage instability at the end of line by using shunt compensation.
   b) Explain the power oscillation damping with shunt compensation.

5. a) List out the methods of controllable VAr generation.
   b) Discuss the basic operating principles of switching converter type VAr generator.

6. a) Draw the block diagram of VAr reserve control.
   b) Briefly discuss the comparison between STATCOM and SVC with their characteristics.

7. a) Explain the concept of series capacitive compensation.
   b) Discuss how to improve the transient stability with static series compensation.

8. Briefly discuss the IPFC with necessary diagrams and its characteristics.

Code No: **R42027** **R10** **Set No.3**

IV B.Tech II Semester Regular/Supplementary Examinations, April - 2015

FLEXIBLE ALTERNATING CURRENT TRANSMISSION SYSTEMS (FACTS)

(Electrical and Electronics Engineering)

Time: 3 hours **Max. Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks
*****

1. a) Explain the dynamic stability considerations of a transmission interconnection with FACTS.
   b) What is the relative importance of controllable parameters of the transmission system?

2. a) What are the basic types of FACTS controllers? Discuss each one with diagram.
   b) Explain the voltage and current rating of high power devices.

3. a) Discuss the basic concept of current source converter with circuit diagrams.
   b) Derive the expressions for fundamental and harmonic voltages of a three phase bridge converter.

4. a) What are the objectives of shunt compensation?
   b) Discuss how to improve the transient stability by using shunt compensation.

5. Explain the thyristor controlled and thyristor switched reactor type VAr generator with circuit and waveforms.

6. Describe the transfer function and dynamic performance of SVC and STATCOM with necessary diagrams.

7. a) Describe how to improve power oscillation damping with static series compensation.
   b) Briefly discuss the thyristor switched series capacitor with circuit diagram and its characteristics.

8. a) What is the need of UPFC instead of separate controllers?
   b) Explain the basic operating principle of IPFC.

Code No: **R42027** **R10** **Set No. 4**

IV B.Tech II Semester Regular/Supplementary Examinations, April - 2015

FLEXIBLE ALTERNATING CURRENT TRANSMISSION SYSTEMS (FACTS)

(Electrical and Electronics Engineering)

Time: 3 hours **Max. Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks
*****

1. Explain with suitable diagram for power flow in a meshed system of a transmission lines with FACTS.

2. a) What are the opportunities of FACTS?
   b) Explain the benefits from FACTS controllers.

3. a) Discuss the basic concept of voltage sourced converter with circuit diagram.
   b) Derive the square wave voltage harmonics for a single phase bridge.

4. Explain the following with respect to shunt compensation
   a) Mid-point voltage regulation.
   b) Transient stability.

5. a) Briefly discuss the basic control approach of switching converter type VAr generation.
   b) Explain the hybrid generators.

6. Describe the regulation slope of static shunt compensator with neat block diagram.

7. a) What are the objectives of series compensation?
   b) Explain the sub synchronous oscillation damping with static series compensation.

8. a) What is the need of IPFC instead of separate controllers?
   b) Explain the basic operating principle of UPFC.