

**Elective-I : Flexible AC Transmission Systems**

P. Pages : 2

**NIR/KW/18/3547**

Time : Three Hours

\*1803\*

Max. Marks : 80

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- Notes :
1. All questions carry marks as indicated.
  2. Solve Question 1 OR Questions No. 2.
  3. Solve Question 3 OR Questions No. 4.
  4. Solve Question 5 OR Questions No. 6.
  5. Solve Question 7 OR Questions No. 8.
  6. Solve Question 9 OR Questions No. 10.
  7. Solve Question 11 OR Questions No. 12.
  8. Due credit will be given to neatness and adequate dimensions.
  9. Assume suitable data whenever necessary.
  10. Illustrate your answers whenever necessary with the help of neat sketches.
  11. Use of non programmable calculator is permitted.

**1.** a) List the basic types of FACTS controller with their symbols. Briefly explain role of each controller. **7**

b) What is the importance of transmission interconnections? **6**

**OR**

**2.** a) How amount of power flow can be controlled in mesh connected a. c. power system? **7**

b) Compare HVDC and FACTS. **6**

**3.** a) Explain working of 3-level voltage source converter in details. **7**

b) Compare VSC and CSC. **6**

**OR**

**4.** a) Explain the working of single phase full wave bridge converter with neat waveform & circuit diagram. **7**

b) Draw the transformer connections for 12 pulse operation & explain its working with waveform. **6**

**5.** a) Explain operation of TSC-TCR. **7**

b) Explain the objectives of shunt compensation. **7**

**OR**

**6.** a) Explain working of STATCOM in detail. **7**

b) Explain functional control scheme for the FC - TCR type static var generator. **7**

- 7.** a) Explain the working principle of SSSC. **7**  
b) Explain how GCSC is dual of TCR. **6**

**OR**

- 8.** a) Explain working of TCSC with the diagram. Also draw the V-I and power losses versus line current characteristic of TCSC. **7**  
b) Discuss the effect of series compensation on **6**  
i) Voltage stability  
ii) Transient stability  
iii) Power oscillation Damping

- 9.** a) Explain the concept of power angle regulator. **7**  
b) Explain Hybrid Phase angle regulator. **7**

**OR**

- 10.** a) Write short note on Quadrature Boost Transformer (QBT). **7**  
b) Explain the working of thyristor controlled power angle regulator (TCPAR) **7**
- 11.** a) Explain working principle of IPFC. **6**  
b) What is UPFC? Explain the operating principle of UPFC. **7**

**OR**

- 12.** a) Explain NGH-SSR damping scheme. **7**  
b) Explain Thyristor controlled Braking resistor (TCBR). **6**

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