

M.E DEGREE EXAMINATIONS: NOV/DEC 2014

(Regulation 2013)

Third Semester

POWER ELECTRONICS AND DRIVES

P13PETE09: Flexible AC Transmission Systems

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 2 = 20 Marks)

1. What is the need for interconnection in electrical power systems?
2. What are the factors which limits the loading capability of a transmission line?
3. What are the different modes of operation of TCSC?
4. What is the level of series compensation required in a symmetrical transmission line to improve the maximum power flow to four times the normal value?
5. What are the conditions required to implement the “Transient free switching”?
6. Draw the simple model of STATCOM.
7. What is the basic difference between IPFC and UPFC?
8. Give the applications of UPFC.
9. What is meant by sub synchronous resonance?
10. Sketch the simple model of TCBR and give its significance.

Answer any FIVE Questions:-

PART B (5 x 16 = 80 Marks)

Q.No:11 is Compulsory

11. a) Give a detailed account on the working of a STATCOM. Discuss the advantages of using multi level converters in a STATCOM. (10)
 b) Discuss on the measures taken to reduce the harmonic distortion in the STATCOM outputs. (6)
 12. a) Discuss the problems relating to AC power transmission. (6)
- (10)

- b) Explain how they can be overcome using FACTS techniques.
13. a) Explain the mechanism of controlling the dc offset in TCSC. (10)
b) Calculate the line current and the reactive power flowing through a 40% series compensated transmission system operating at 220kV, 50Hz. The operating load angle is 80° and the line reactance is 8Ω . In order to increase the current flowing through the transmission line to 30% more, what must be the compensation level? How it can be realized using TCSC with capacitance of $12\mu\text{F}$. (6)
14. a) Explain the operation of TSC – TCR with the help of neat circuit diagrams. (8)
b) Develop control circuit for TSC – TCR. Mention its characteristic features. (8)
15. a) Explain the principle of operation of UPFC. (8)
b) Discuss the control capabilities of UPFC. (8)
16. Describe the principle of operation of thyristor controlled voltage regulator and current limiter. Explain its working.
