B.E. Electrical (Electronics & Power) Engineering Eighth Semester

EP8041 - Elective-II : Facts & Reactive Power Controller

P. Pages : 2 **GUG/W/18/2013**

Time : Three Hours * 1 5 4 2 * Max. Marks : 80

Notes : 1. All questions carry equal marks.
2. Assume suitable data wherever necessary.
3. Illustrate your answers wherever necessary with the help of neat sketches.
4. Students may avail internal choice.

1. a) Write short note on: **8**
i) Thermal capability. ii) Stability limit.

b) Why FACTS technology is called as Flexible? Explain in details. **8**

OR

2. a) i) What are the different types of storage devices. **8**

ii) What is the importance of storage in case of converter based FACTS devices?

b) What are the different parameters to control power flow in a.c. systems? Give their relative importance. **8**

3. a) i) What are the different types of losses in STATCOM? **8**

ii) 'Draw and explain the control scheme of STATCOM.

b) Explain TSC and TCR by covering the following points : **8**
i) Diagram. ii) Operation.

OR

4. a) Explain the functional control scheme for FC-TCR. **8**

b) Why transient free switching of TSC is needed? How it is achieved? **8**

5. a) Explain how GCSC and TCR are duals of each other. **8**

b) With the help of power angle curve explain how transient stability is improved with the help of series controller. **8**

OR

6. a) Explain with a neat sketch and waveforms the SSSC. **8**

b) How series FACTS devices respond to the problem of Sub-synchronous resonance. **8**

7. a) Explain basic two converter scheme for IPFC. **8**

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b) Draw and explain the block diagram for a basic UPFC control scheme. **8**

OR

8. a) Explain how an UPFC scheme can be implemented using two back to back voltage source converters. **8**

b) Give clear differentiation between on UPFC and IPFC. **8**

9. a) List out different types of reactive power compensations, compare them on the basis of losses, control range, control capability and response time. **8**

b) Derive relationship between active power, reactive power and surge impedance loading using generalized equation of loss less transmission line. **8**

OR

10. a) Describe requirement of reactive power in power system classify and explain reactive power compensation. **8**

b) Explain the operation of phase shifting transformer in transmission line. **8**

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