

M. Tech. Electrical Power System (CBCS Pattern) Semester-I  
**PEPS12 - Application of Power Electronics in Power System**

P. Pages : 2

Time : Three Hours



**GUG/W/24/10970**

Max. Marks : 70

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- Notes :
1. All questions carry equal marks.
  2. Answer **any five** questions.
  3. Due credit will be given to neatness and adequate dimensions.
  4. Assume suitable data wherever necessary.
  5. Illustrate your answers wherever necessary with the help of neat sketches.
  6. Use of Drawing Instruments and non-programmable calculator is permitted.

1. a) Write a short note on dynamic stability considerations of a transmission interconnection. 7  
b) Explain the power flow in a meshed system. 7
2. a) Write a short note on the basic types of FACT Controllers. 7  
b) How do the FACT Controllers control the flow of power and improve the system stability? 7
3. a) Explain the improvement of transient stability using static series compensator. 7  
b) Explain the operation of TSC-TCR type static var generator giving its 7  
i) Circuit diagram ii) V-I characteristics  
iii) VAR output characteristics iv) Loss characteristics
4. a) Draw the equivalent circuit diagram and explain the working principle of TCSC. What are the merits and demerits of TCSC? 7  
b) A thyristor controlled inductor used in a static VAR compensation circuit in a 11 kV, 50 Hz ac network has inductance of 5 H. Find the range of adjustable VAR using this inductor. 7
5. a) Give the block diagram of STATCOM. Draw its V-I characteristics. Explain advantages of STATCOM. 7  
b) Discuss the role of voltage source converter in STATCOM for reactive power control. 7
6. a) Write short note on dynamic performance of UPQC. 7  
b) Write short note on interline power flow controller (IPFC) 7
7. a) Explain step by step what are the various essential controls that are required for the stable operation of HVDC link. 7

b) Describe Analysis of 3-phase, 6 pulse, converter, with grid control overlap angle. **7**  
(Given that overlap angle is less than equal to 45 degrees).

**8.** a) A Bipolar two terminals HVDC link is delivering 1000 MW at 500 kV at receiving end. **10**  
The total losses in DC circuit are 50 MW. Calculate the following:  
i) Sending end power.  
ii) Sending end voltage.  
iii) Power in the middle of line.  
iv) Voltage in the middle of the lines.  
v) Total resistance of DC circuit.

b) Find the value of average DC voltage for overlap angle  $(\mu) > 60^\circ$  of HVDC converters. **4**

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