

DEPARTMENT OF ELECTRICAL ELECTRONICS
QUESTION BANK (2018-2019 AY)

Subject: FACTS**Year/Sem : IV/ II**

UNIT - I

- 1 a) What are the limitations for the loading capability of a transmission line? Explain. [5]
b) How can the power flow controlled in mesh networks. [5]
- 2) a) "Injecting the voltage into transmission line perpendicular to the line current mostly changes the active power". Justify with the help of phasor diagram. [5]
b) What are the parameters of the transmission line that can be controlled to control the power flow? Explain the importance of these parameters. [5]
- 3) a) What is the need for transmission interconnections? Explain. [5]
b) Discuss how power flow can be controlled in parallel paths.[5]
- 4) a) Explain the power flow in parallel circuits with FACTS.(5)
b) What are the limits of the loading capability of lines? And only discuss with stability condition.(5)
- 5) a) Explain dynamic stability considerations of a transmission interconnection with FACTS.(5)
b) What is the relative importance of controllable parameters of the transmission system? (5)
- 6 a) What are the basic types of FACTS controllers? Discuss each one with diagram.(5)
b) Explain the voltage and current rating of high power devices. (5)
- 7) a) Discuss the benefits of FACTS controllers.(5)
b) Describe the parameters trade-off of high power devices. (5)
- 8). a) What are the opportunities of FACTS?(5)
b) Explain the characteristics of high power devices used in FACTS. [5]
- 9) a) What are the major issues in AC power transmission? Explain how they addressed using FACTS devices. [5]
b) Classify different FACTS controllers. Explain them briefly. [5]

UNIT – II

- 1a) Explain the operation of three phase full wave bridge converter with circuit diagram and waveforms. (5)
b) Explain the operation of single phase full wave bridge converter with circuit diagram and waveforms. (5)

2. a) Discuss the operation of three phase current source converter with circuit diagrams. (5)
b) What are the merits and demerits of voltage source converter with compared to current source converter? (5)
- 3) a) With a neat circuit diagram, explain the basic operation of a voltage sourced converter. [5]
b) What are the effects of harmonics? Prove that the fundamental RMS component of a square wave ac voltage for a single-phase bridge converter is 0.9 times the dc voltage. [5]

UNIT – III

- 1) a) Explain the objective of reactive shunt compensation in transmission lines. [5]
b) With phasor diagrams and power-angle characteristics, explain a two machine power system with ideal midpoint reactive compensation. [5]
- 2) a) “For a radial line, the end of the line is the best location for compensator”. Justify. [5]
b) Explain how midpoint voltage regulation helps in increasing the transmittable power of a line. [5]
- 3) a) What are the objectives of static shunt compensation? [5]
- b) Discuss the improvement of transient stability with midpoint voltage regulation. [5]
 - 4) a) Illustrate the midpoint voltage regulation for line segment by using shunt compensation. (5)
- b) List out the objectives of shunt compensation. (5)
 - 5) a) Discuss how to prevent voltage instability at the end of line by using shunt compensation. [5]
- b) Explain the power oscillation damping with shunt compensation. [5]
 - 6) Explain the following with respect to shunt compensation
a) Mid-point voltage regulation. [5] b) Transient stability. [5]
- 7) a) Discuss the basic concept of voltage sourced converter with circuit diagram.(5)
b) Derive the square wave voltage harmonics for a single phase bridge. (5)
- 8) a) List different methods for controllable var generation. [5]
b) Explain the operation of Thyristor-Controlled Reactor (TCR) with necessary waveforms. [5]

UNIT - IV

- 1) A) Discuss the operation of STATCOM. Draw their V-I operating characteristics. [5]
B) Discuss the transient stability enhancement with STATCOM. [5]
- 2) a) Explain the operating V-I characteristics of SVC and STATCOM. [5]
b) With a neat block diagram, explain the implementation of power oscillation damping by using static var generators. [5]
- 3) a) **What is regulation droop? Explain its significance.**[5]
b) **Draw and discuss the V-I characteristics of SVC.** [5]
- 4) Describe the transfer function and dynamic performance of SVC and STATCOM with necessary diagrams. [10]

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5. a) Draw the block diagram of VAr reserve control. [5]

- b) Briefly discuss the comparison between STATCOM and SVC with their characteristics. [5]
6. Describe the transient stability enhancement and power oscillation damping with SVC and STATCOM with necessary diagrams. [10]

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7) With circuit diagram and waveforms, explain the operation of TCR and TSR. Draw their V-I characteristics. Also differentiate between them. [10]

8) a) Explain the operation of Thyristor-Switched Capacitor (TSC). [5]

b) With circuit diagram and waveforms, explain the operation of Thyristor-Switched Reactor (TSR). [5]

9a) Briefly discuss the basic control approach of switching converter type VAR generation. [5]

b) Explain the hybrid generators. [5]

10) a) List out the methods of controllable VAR generation. [5]

b) Discuss the basic operating principles of switching converter type VAR generator. [5]

11) Explain the i) thyristor-switched capacitor, ii) thyristor controlled reactor type VAR generator with circuit diagram and its characteristics. [10]

UNIT – V

1) A) What are the objectives of series Compensation? (5)

B) Explain the operation of GTO Thyristor Controlled Series capacitor? (5)

2) A) How the Voltage stability can be improved by using series Compensation? (5)

B) Explain the operation working of Thyristor controlled Series Capacitor? (5)

3) A) Explain the operation working of Thyristor switched Series Capacitor? (5)

B) How the Power Oscillation damping can be reduced by using series compensation? (5)

4) A) Explain the improvement of Transient stability by using series compensation? (5)

B) What are the basic control schemes for GCSC, TCSC TSSC? (5)

5) A) Explain the operation of GTO Thyristor Controlled Series capacitor? (5)

B) Explain the operation working of Thyristor switched Series Capacitor? (5)

6) A) How the Voltage stability can be improved by using series Compensation? (5)

B) Explain the operation working of Thyristor switched Series Capacitor? (5)

UNIT – VI

1) A) Explain the Basic operating principle of UPFC Controller? (5)

B) Explain how the real reactive power flow control can be done by using UPFC Controller? (5)

2) A) Compare the performance of UPFC with Series compensators? (5)

B) Explain the Control structure of UPFC basic function of shunt Converter? (5)

3) A) Explain with block diagram for P Q Control by UPFC?(5)

B) Explain the Basic operating principle of UPFC Controller? (5)

4) A) Explain the Basic operating principle of IPFC Controller? (5)

B) Explain the Control structure of UPFC? (5)

5) A) Explain how the real reactive power flow control can be done by using UPFC Controller? (5)

B) Explain the Basic operating principle of IPFC Controller? (5)

- 6) A) Explain the Control structure of IPFC? (5)
B) Compare the performance of UPFC with Controlled Phase angle regulators? (5)

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