Registration No : | | | | | | | | | | |

Total Number of Pages : 02 **B.Tech.**
PEL6J005

6th Semester Regular Examination 2017-18
FLEXIBLE AC TRANSMISSION SYSTEMS
BRANCH : EEE
Time : 3 Hours
Max Marks : 100
Q.CODE : C357

Answer Part-A which is compulsory and any four from Part-B.
The figures in the right hand margin indicate marks.

Part – A (Answer all the questions)

Q1. Answer the following questions : *multiple type or dash fill up type :* **(2 x 10)**

a) The FACTS controllers can enable a line to carry power closer to its _____rating.

b) Which is not a FACTs device?
(i) TSC (ii) STATCOM
(iii) TCC (iv) TSR

c) Synchronous Condenser is used to :
(i) Change line reactance (ii) Compensate real power
(iii) Improve transient stability (iv) Compensate reactive power.

d) UPFC is combination of :
(i) TSR-TSC (ii) STATCOM-SSSC
(iii) STATCOM-SVC (iv) STATCOM-FC_TCR

e) Role of capacitor in DC link of STATCOM is to :
(i) inject active power (ii) inject real power
(iii) No power sharing (iv) Absorbs reactive power.

f) SSSC can inject voltage to the line with _____ angle with the line voltage.

g) MOV is a part of :
(i) TCVR (ii) TCPAR
(iii) TCVL (iv) HVDC

h) AC power transmission over long line is limited by _____ impedance of the line.

i) Voltage collapse can be prevented by :
(i) Reactive power Compensator (ii) Active power Compensator
(iii) Changing Phase angle (iv) None of the above.

j) Homopolar link is associated with :
(i) UPFC (ii) UPQC
(iii) HVDC (iv) IPFC

Q2. **Answer the following questions: *Short answer type*** **(2 x 10)**

a) Why the shunt compensation is attempted always at midpoint of transmission line?

b) Draw the block-diagram of SVC voltage regulator in integrated current droop form.

c) Mention the modes of operation of TCSC.

d) Mention the disadvantages of fixed series compensation of the transmission line.

e) How the reactive power compensation is achieved using STATCOM?

f) Explain the role of DC link in UPFC.

g) What are the classifications of different frequency ranges of control action in FACTs Controllers?

h) Draw the impedance Vs Delay angle characteristics of TCSC.

i) Mention the objectives of the FACTs.

j) What is Bang Bang control?

Part – B (Answer any five questions)

Q3. **a)** Explain the operation of STATCOM based on the operation of syn. m/c as rotating syn. Condenser. Explain the role of capacitor in DC side of STATCOM. **(10)**

b) What is the importance of storage in case of converter based FACTS devices? **(5)**

Q4. **a)** With the help of power angle curve explain how transient stability is improved with the help of series controllers. **(10)**

b) Explain. How TCBR is used for power oscillation damping? **(5)**

Q5. **a)** Explain the principle of operation of TCSC. Also discuss the different modes of operation of TCSC. **(10)**

b) Explain the principle of operation of Inter line Power Flow Controller (IPFC) with neat sketch. **(5)**

Q6. **a)** With neat sketch, explain how reactive shunt compensation can significantly increase the maximum transmittable power of a line. **(10)**

b) Give comparison between STATCOM and SVC. **(5)**

Q7. **a)** Briefly explain the basic UPFC control scheme with suitable block diagram. **(10)**

b) Briefly explain about the factors which limit loading capability. **(5)**

Q8. **a)** With neat sketch, explain about operation of GCSC. **(10)**

b) What are the advantages of 12 pulse converter over 6 pulse converter and how it is achieve by transformer connections?. **(5)**

Q9. **a)** What do you mean by variable impedance type Static Var Generator? Explain the operation of Thyristor Switched Capacitor (TSC). **(10)**

b) Give comparison between HVDC and FACTS. **(5)**