

Assignment No: 2

Q No 1:- State the silent Features of STATCOM?

Ans:- STATcom (Static Synchronous Compensator)

- * The STATcom has the ability to exchange active power with the line through the charge and discharge of the DC link capacitor.
- * The STATcom is a shunt-connected FACTS device that is used primarily for reactive power control.
- * Always a symmetrical power reading in the inductive and capacitive operating regions.
- * When output voltage is decreases below the utility voltage then the current flows from system to converter and the inductive reactive power from the system.
- * STATcom is seen as voltage source behind a reactance meaning that capacitor bank and shunt reactors are not needed for reactive power generation and absorption.

Q No 2:- List the modes of operation of STATCOM.

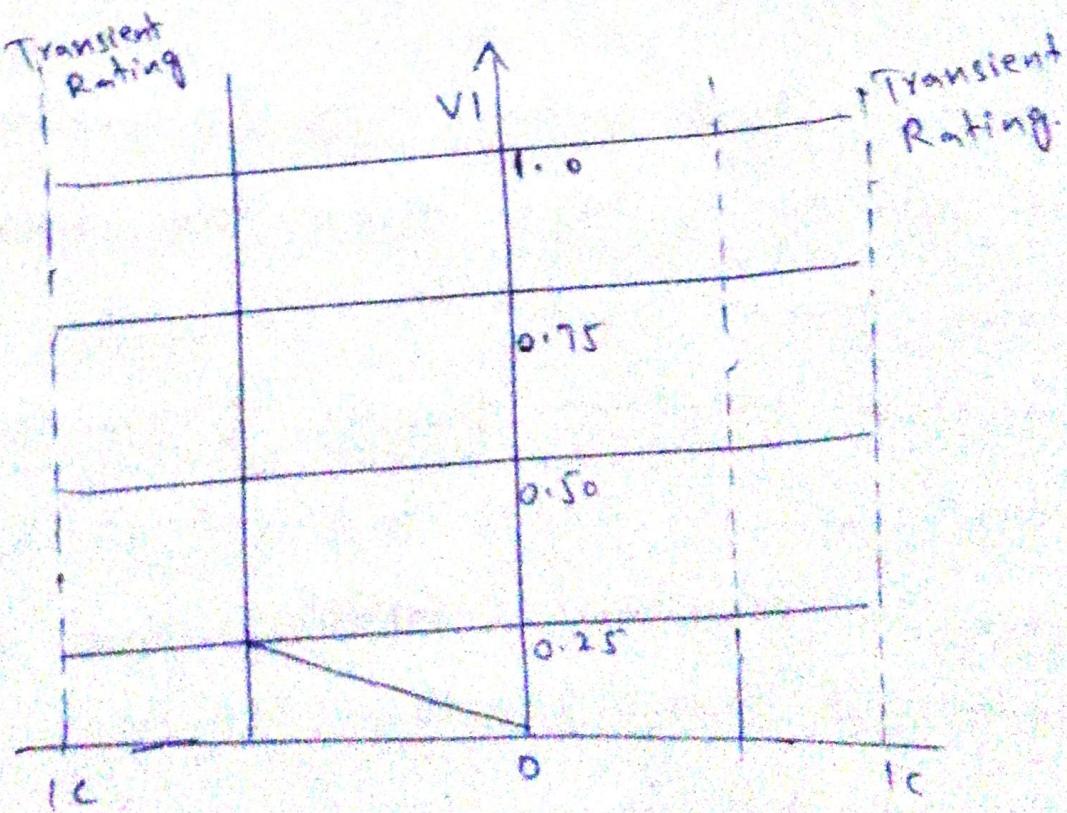
Ans:- The STATCOM has two main modes of operation -

- * Inductive (Lagging) mode of operation
- * Capacitive (Leading) mode of operation.

Q No 3:- Draw the VI characteristics of STATCOM.

Ans:- VI characteristics of STATCOM.

* A typical VI characteristic of STATCOM is in Fig.



- * The characteristic of a STATcom reveals another strength of this technology that it is capable of yielding the full output of capacitive generation almost independently of the system voltage. This capability is useful for situations in which the STATcom is needed to support the system voltage - during and after faults.
- * Figure illustrates that the STATcom has an increased transient rating in which the capacitive and inductive operating regions.
- * The STATcom can provide full capacitive reactive power at any system voltage.
- * The maximum attainable transient overcurrent in the capacitive region is determined by the maximum current turn-off capability of the converter switches.
- * Any combination of re-power Generation or absorption with naturally commutated therefore the transient current rating of the STATcom

is required with an energy storage device of suitable capability. With this capability as depicted extremely effective control strategies for the modulation of reactive and real output power can be devised to improve the transient and dynamic system stability limits.

Q No 4:- Explain the principle operation and application of STATCOM ?.

Ans:- Principle operation of STATCOM:-

The basic principle of operation of a STATCOM is the generation of a controllable AC voltage source behind a transformer leakage reactance by a voltage source converter connected to a DC capacitor.

A STATCOM is a controlled reactive power source that provides the desired reactive power generation and absorption entirely by means of electronic current waveform in a voltage source converter.

Application of STATCOM:-

The STATCOM can be used for power quality control e.g. flicker suppression and to balance the phase voltages. In the case of renewable energy power generation such as solar or wind generation the STATCOM can be used for voltage stability control, reactive power control.

Q No 5:- where the First STATCOM was implemented?

Ans:- The First STATCOM was implemented by Kansai electric power company JAPAN used and implemented the first STATCOM device.

Q No 6:- what is meant by STATCOM?

Ans:- STATCOM is a static synchronous condenser (STATCOM) is a regulating device used as alternating current electricity transmission networks. reactive current of STATCOM can be controlled and compensate

(6)

reactive power for system automatically.
It also solve problems of harmonics
interference switching parallel capacitor
bank.

Q No 7:- what are the common advantages of STATCOM?

Ans:- STATCOM is used to enhance the power transfer.

- * Improve the Low voltage condition and flickers.
- * Control the reactive power sources.
- * Very quicker response.
- * Transient stability enhancement is direct through rapid bus voltage control.

Q No 8:- Define the term static VAR Compensator (SVC)

Ans:- A static VAR compensator (SVC) is a set of electrical devices for providing fast acting reactive power on high voltage

Electricity transmission networks - Svc's are part of the facts devices family, regulating voltage, power factor, harmonics and stabilizing the system. A static VAR compensator has no significant moving parts - only internal switchgear is in it. Prior to the invention of the power factor compensation was the presence of large rotating machine such as synchronous condensers or switched capacitor banks.

Q No 9:- Explain the principle operation and application of SVC.

Ans:- Principle operation of SVC:-

SVC is based on transistors without gate-turn off capability. SVC is a shunt connected static var generator or absorber whose output is adjusted to exchange capacitive or inductive current so as to maintain or control specific parameters of the electrical power system.

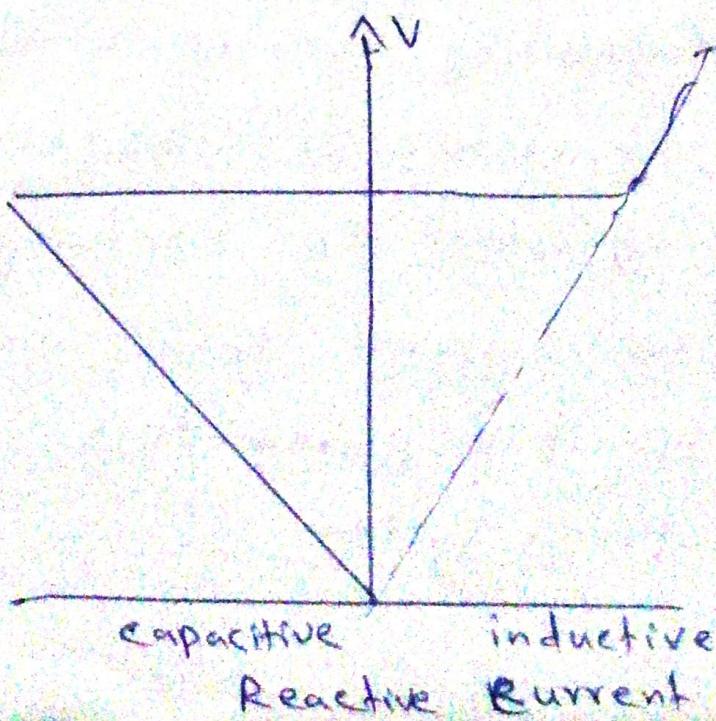
Applications of SVC -

- * SVC is used to regulate the grid voltage.
- * Maintain the Grid Voltages, under limitation.
- * Prevention of Voltage stability.
- * Enhancement of power system Damping.
- * SVC is used to transient stability.
- * used to Lowering the system Voltage.

Q No 10:- Draw the VI characteristics of SVC.

Ans:- SVC absorbs reactive Power (SVC)

When system voltage is low the SVC generates reactive power, when system voltage is high.



Q No 1:- what are the common advantages of SVC?

Ans:- Advantages of SVC:-

- * It improves the Load power factor and reduced Line Losses and improved system capability.
- * Stabilized voltage, for the Long Lines better power delivery to the Load side.
- * SVC significantly reduces the amount of reactive power in the system.
- * It improves the transient stability of the system.
- * SVC increases the power transmission capability of transmission lines.