EXPERIMENT 6

Demonstration of:
a) **DC-DC convertor (Chopper)**
b) **DC –AC converter-PWM waveform (Sine PWM Inverter)**
c) **Use of DC-AC converter for speed control of induction motor (VFD)**

## (a) Object: DC-DC convertor ,(Chopper)

Theory:

A chopper is a static device that converts fixed dc input voltage to a variable dc output voltage directly. A chopper is a high-speed on/off semiconductor switch. It connects source to load and disconnects the load from source at high-speed. Also known as dc-to-dc converter. Widely used for motor control. Also used in regenerative braking.

Types of Chopper:

1. Step-up choppers: In step up chopper output voltage is more than input voltage.
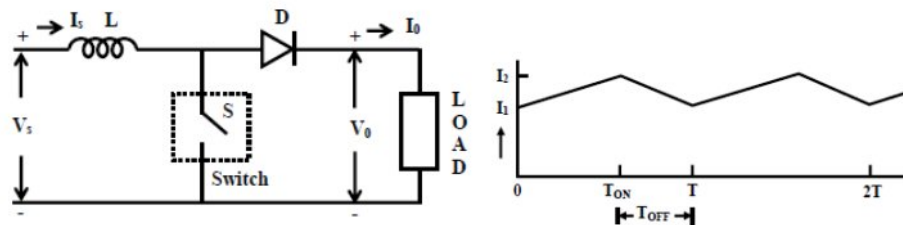
2. Step-down choppers: In step down chopper output voltage is less than input voltage.
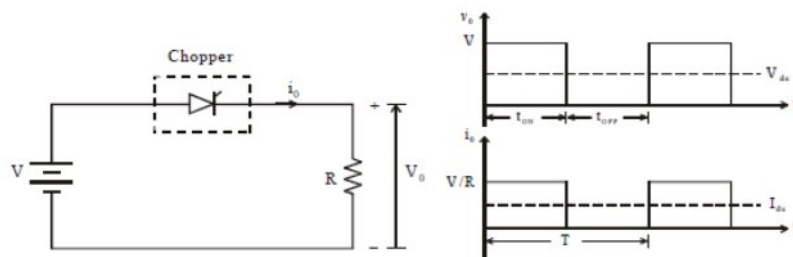
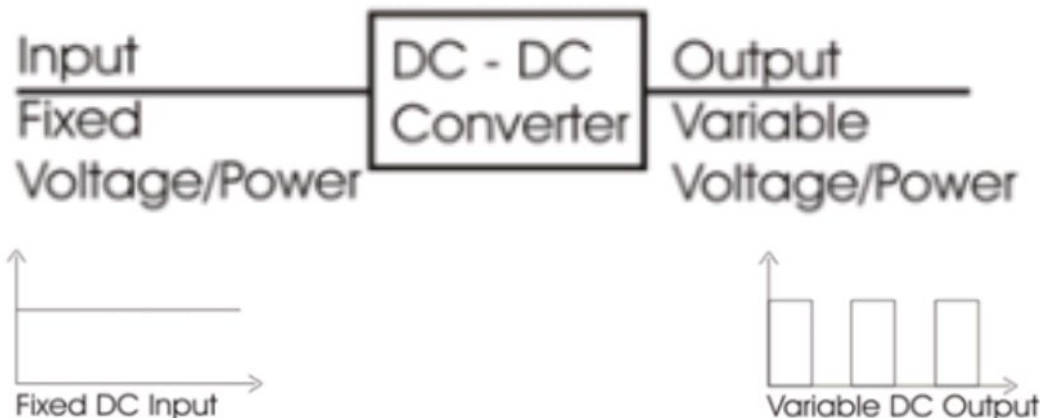**Basic Block Diagram of Chopper:**

Fig Block diagram of Chopper

Basic principal behind the chopper is it converts Fix DC input voltage to Variable DC output voltage.

High power application:

Applications of Chopper:
1. They are used for DC motor control (battery-supplied vehicles), solar energy conversion and wind energy conversion.
2. Choppers are used in electric cars, airplanes and spaceships, where onboard-regulated DC power supplies are required.
3. In general, Chopper circuits are used as power supplies in computers, commercial electronics, and electronic instruments.
4. DC Motor Speed Control
5. Battery Chargers
6. DC Voltage Boosting
7. Battery Operated Electric Cars

Comparison (step down chopper and step up chopper)

Comparison between step up and step down chopper:

Sr no	parameters	Step down chopper	Step up chopper
1	Range of output voltage	0 to V volts	V to +∞ volts
2	Position of chopper switch	In series with load	In parallel with load
3	Expression for output voltage	$VL\ dc = D \times V$ volts	$V_o = V/(1 - D)$ volts
4	Use	For motoring operation, for motor load	For regenerative braking for motor load.
5	Applications	Motor speed control	Battery charging/voltage boosters

Result: The study of DC-DC chopper has been done.