LAB ASSIGNMENT – 4

Course: Basic Electrical and Electronics Engineering

Course Code: EEE1001

Faculty Name: Prof. Medaramelta Praveenkumar

Slot: L-19+L-20

Name: Priyal Bhardwaj

Registration Number: 18BIT0272

Submission Date: 14.09.2018

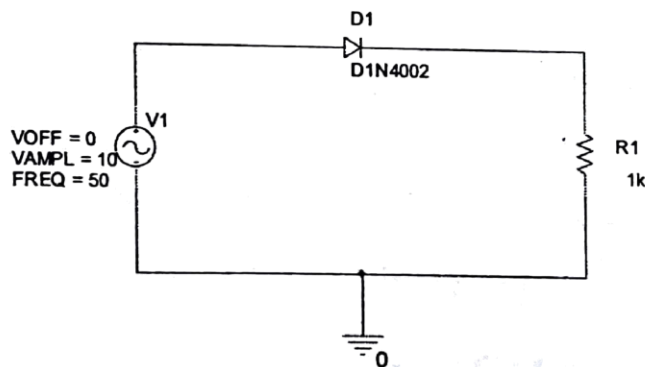# Design of Single phase Half wave and Full wave Rectifiers

Aim:

Apparatus/Tool required:

ORCAD / PSpice simulator -> **Diode Library - D1N4002/4007,**
Source Library – Vsin & Ground (GND) – 0(zero)
Analog Library – R
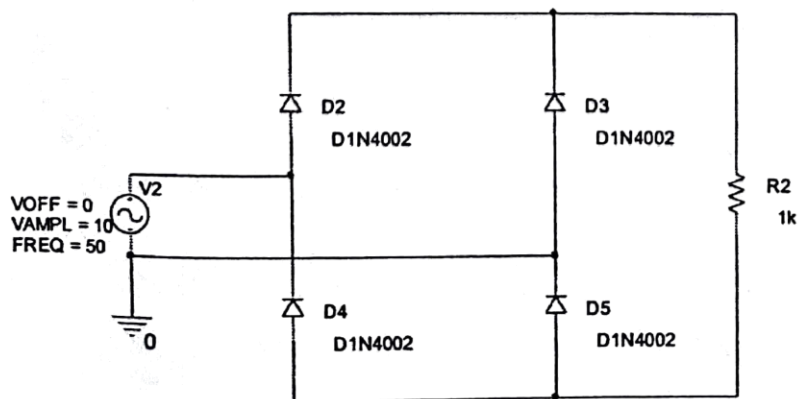Simulation Settings: **Analysis Type - Time Domain**

Run to time: 40ms (for 2 cycles)

Circuit Diagram:

Single phase Half – wave Rectifier

D1
D1N4002

VOFF = 0
VAMPL = 10 V1
FREQ = 50

R1
1k

0

Single phase Full – Wave Rectifier

D2   D3
D1N4002   D1N4002

VOFF = 0
VAMPL = 10 V2
FREQ = 50

R2
1k

0

D4   D5
D1N4002   D1N4002

Theory:

Half – wave Rectifier

During the positive half-cycle the diode is under forward bias condition & it conducts current to load resistance. A voltage is developed across the load, which is same as the input AC signal of the positive half-cycle.

Alternatively, during the negative half-cycle the diode is under reverse bias condition & there is ~~input voltage~~ no current flow through the diode. Only the AC input voltage appears across the load & it is the net result which is possible during the positive half-cycle. The output voltage pulsates the DC voltage.
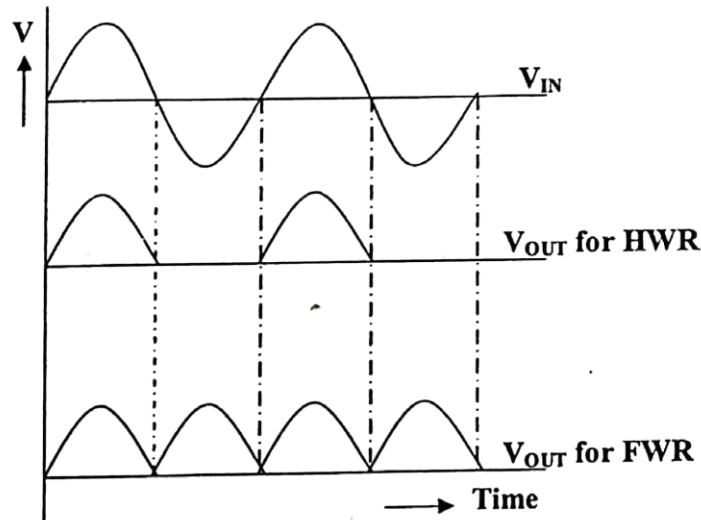
Full – wave Rectifier

In a full wave rectifier circuit we use 2 diodes, one for each half of the wave. A multiple winding transformer is used whose secondary winding is split equally into 2 halves with a common center tapped connection. Configuration results in each diode conducting in turn when its anode terminal is positive with respect to the transformer center point produces an output during both half-cycles. Full rectifier advantages are flexible compared to that of half-wave rectifier

Procedure:

1) Construct the given circuit.

2) Open Capture CIS. Place the circuit for half-wave rectifier.

3) Edit the simulation settings accordingly

4) Obtain graph.

5) Place the circuit for full-wave rectifier.

6) Edit simulation settings accordingly.

7) Obtain graph.

8) Note your observations.

Model Graph:

Result

The graph of half-wave rectifier and full-wave rectifier is verified.

Inference Half-wave rectifier can be used for power rectifier & signal peak detector, whereas Full-wave rectifier can be used for laptop chargers & car alternatives.

Reg. No: 18BIT0272 Name: PRIYAL BHARDWAJ Date: 14.09.2018

SIMULATION CIRCUITS & GRAPHS

Half Wave Rectifier

Full Wave Rectifier