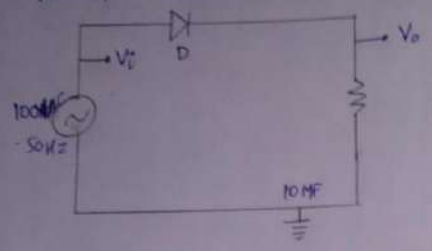
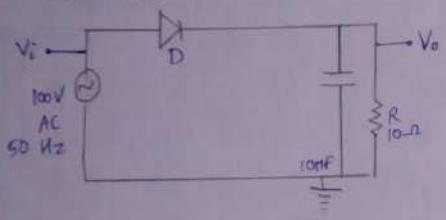
CIRCUIT DIAGRAM

Half-wave rectifier:

WITHOUT FILTER



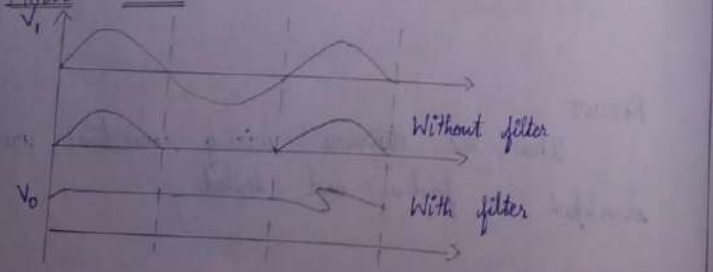
WITH FILTER



TABULATION:

INPUT VOLTAGE		OUTPUT VOLTAGE			
		Without filter		With filter	
V_{pp} (V)	t (μs)	V_{pp} (V)	t (μs)	V_{pp} (V)	t (μs)
100 V	20 MS	100V	100MS	100V, 85V	5MS, 25MS

MODEL GRAPH:



EXPT NO: 4

HALF WAVE AND FULL WAVE RECTIFIER

AIM:

To simulate the following circuits proteus

i) Half wave rectifier

ii) Full wave rectifier

APPARATUS REQUIRED:

Laptop with proteus software

THEORY:

A rectifier is a circuit that converts alternating current (AC) into direct current (DC).

Half-wave rectifier:

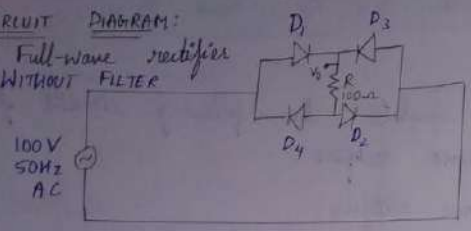
Half wave rectifier conducts only during positive half cycle. During positive half cycle the diode conducts and the output voltage is equal to the input voltage. During negative half cycle, the diode does not conduct and the output voltage is equal to zero.

Full-wave rectifier:

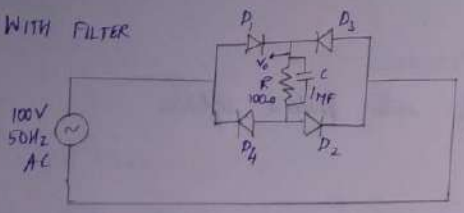
Full-wave rectifier conducts during both positive and negative half cycle. During positive half cycle, the output voltage ~~during~~ is equal to input voltage. During negative half-cycle, the output voltage is equal to negative of the input voltage.

CIRCUIT DIAGRAM:

Full-wave rectifier WITHOUT FILTER



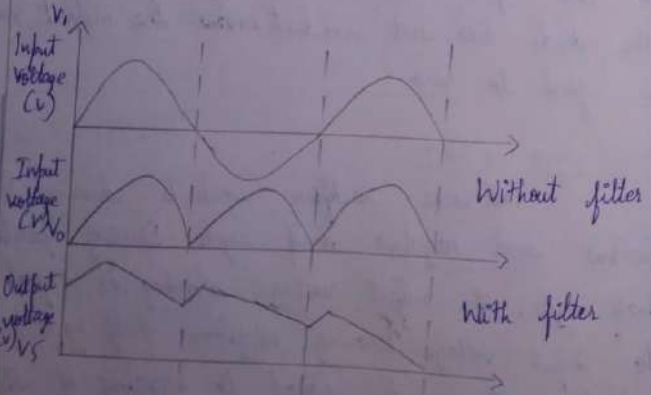
WITH FILTER



TABULATION:

INPUT VOLTAGE		OUTPUT VOLTAGE			
		Without filter		With filter	
V_m (V)	t (ms)	V_m (V)	t (μs)	V_m (V)	t (μs)
50V	20MS	50V	5MS	100V, 46V	5MS, 14MS

MODEL GRAPH:

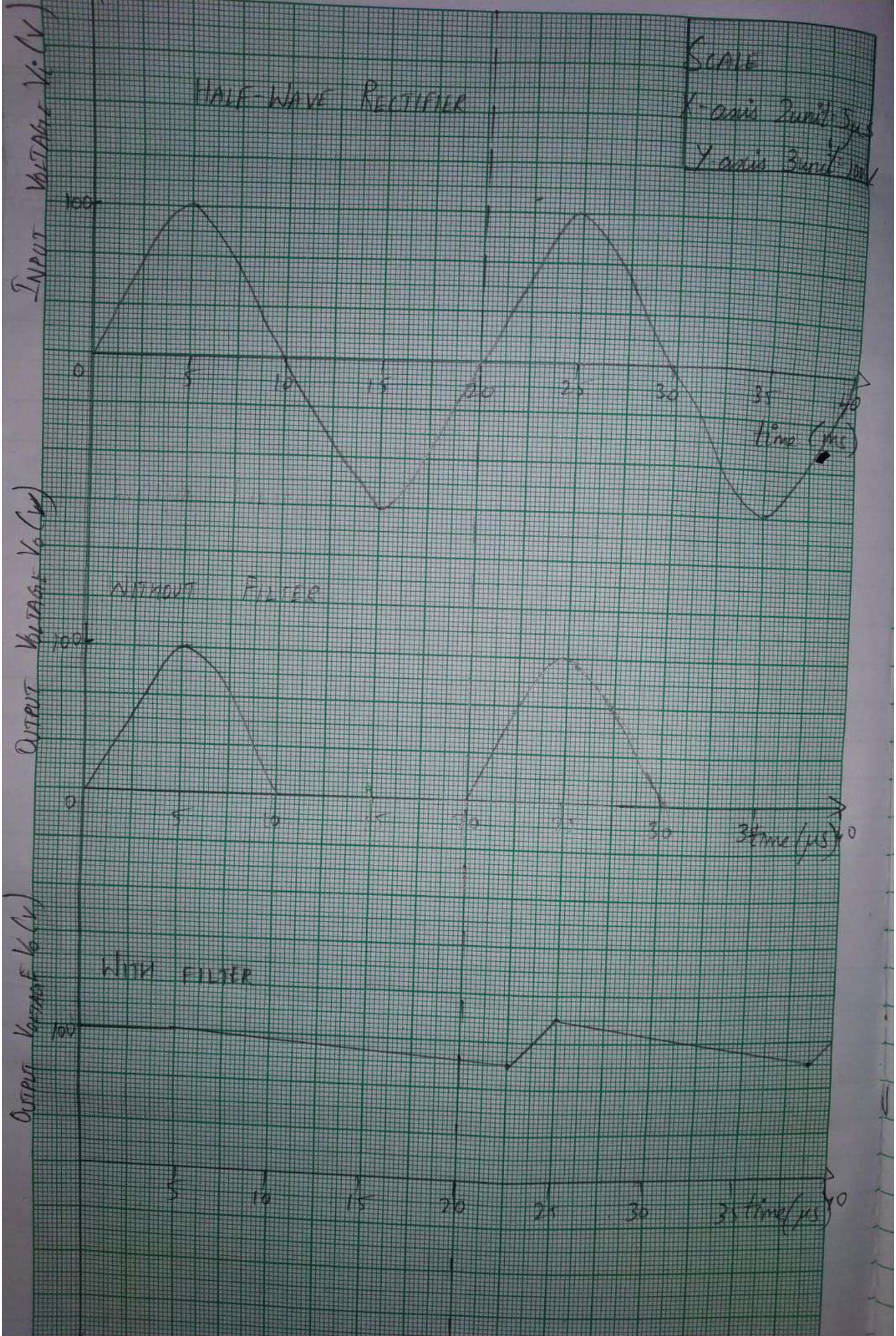


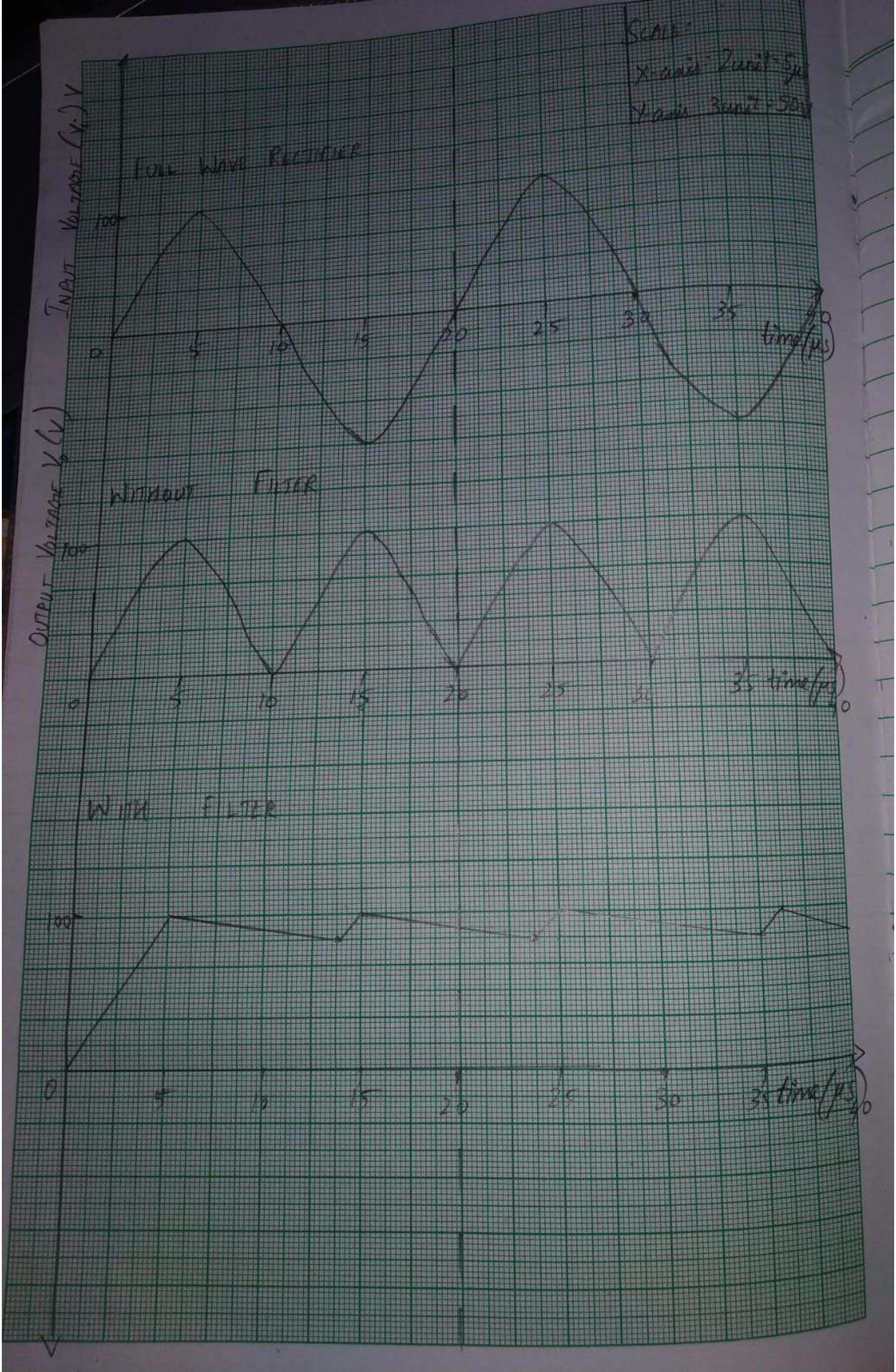
The output of the rectifier circuit is impure DC.

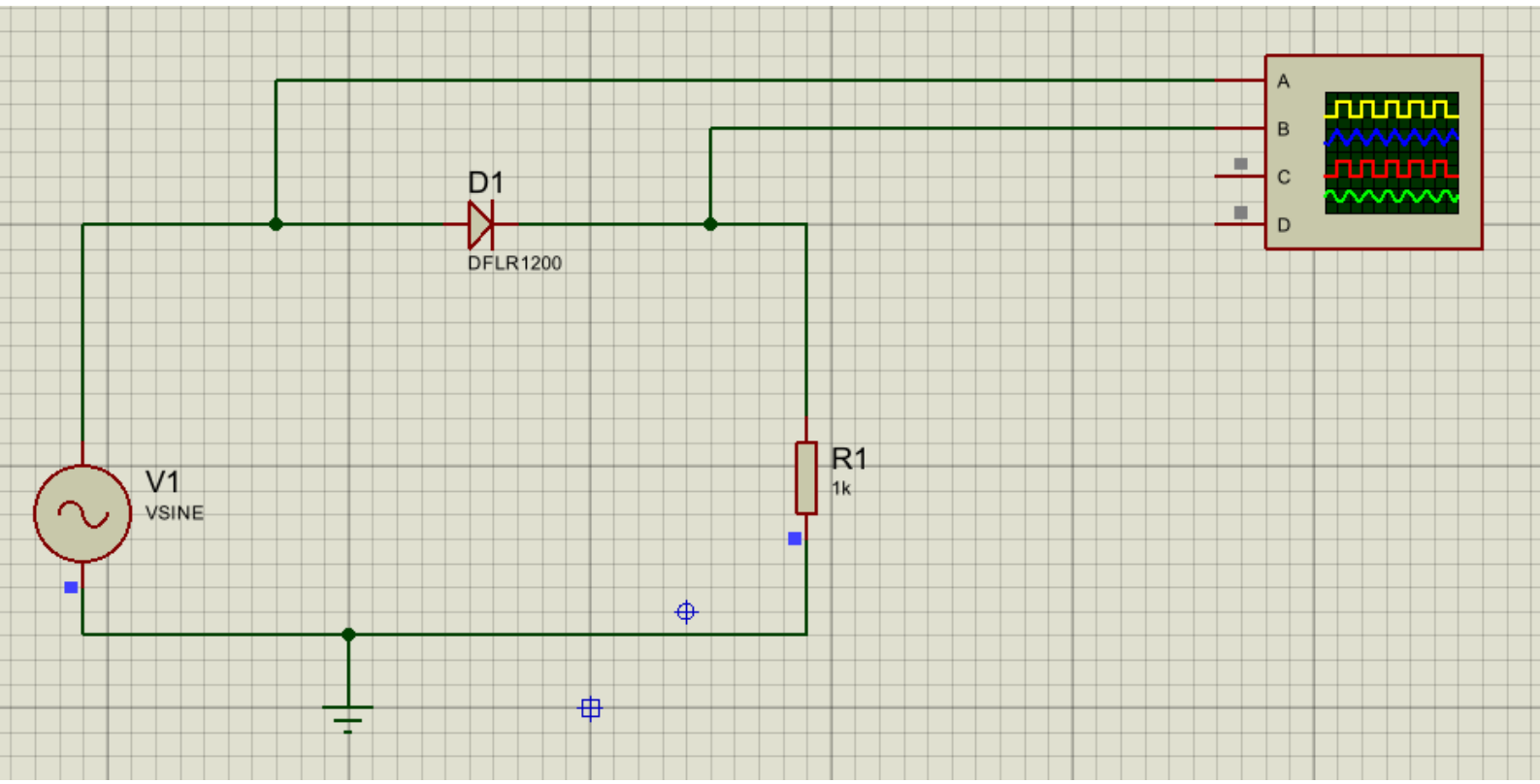
In order to get pure DC the output is filtered by a capacitor filter.

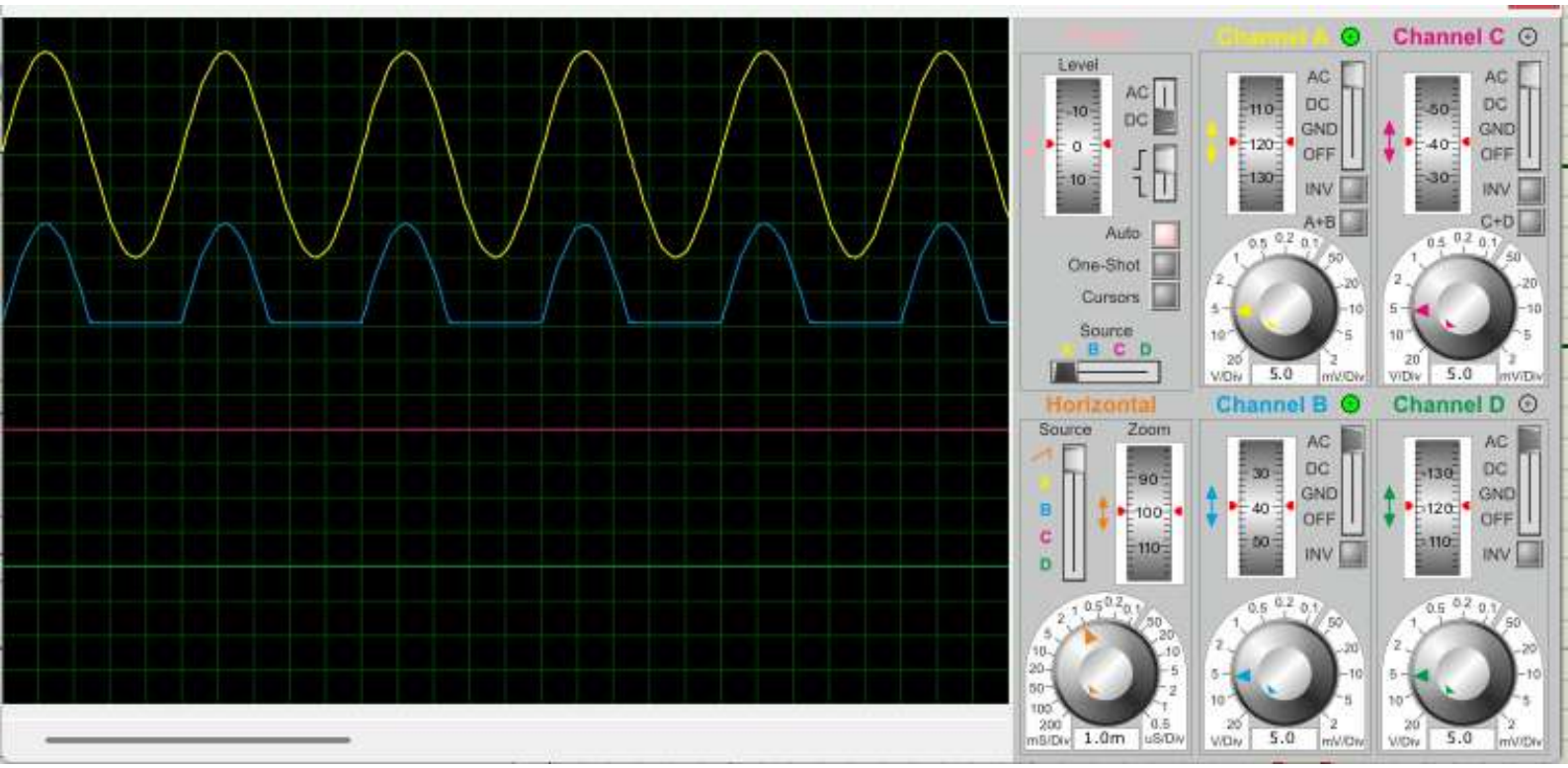
PROCEDURE:

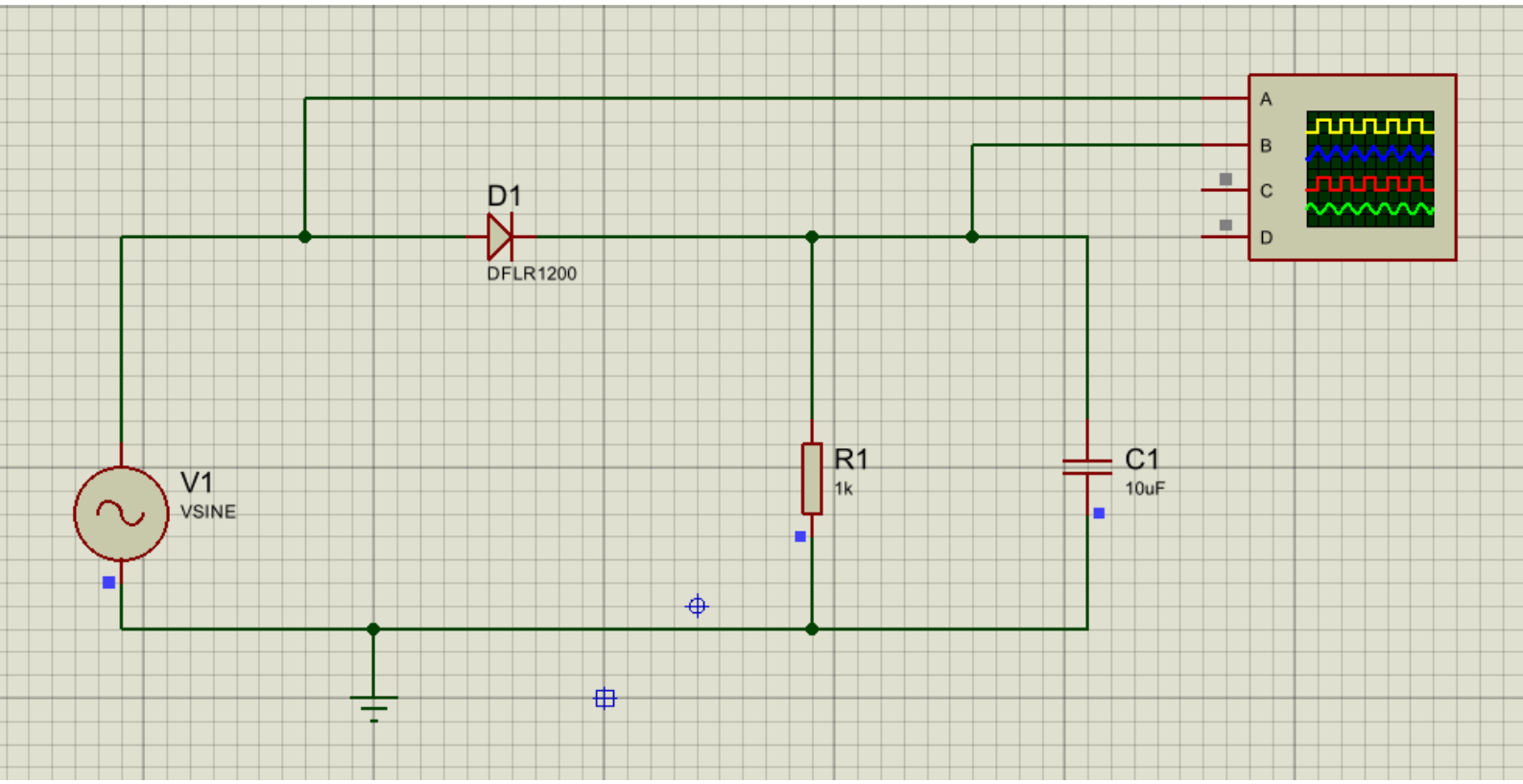
1. Drag the required components from the proteus library.
2. Connect the components as per the circuit diagram.
3. Measure the input and output voltages and note the tabulations.
4. Draw the graph for input and output voltages.

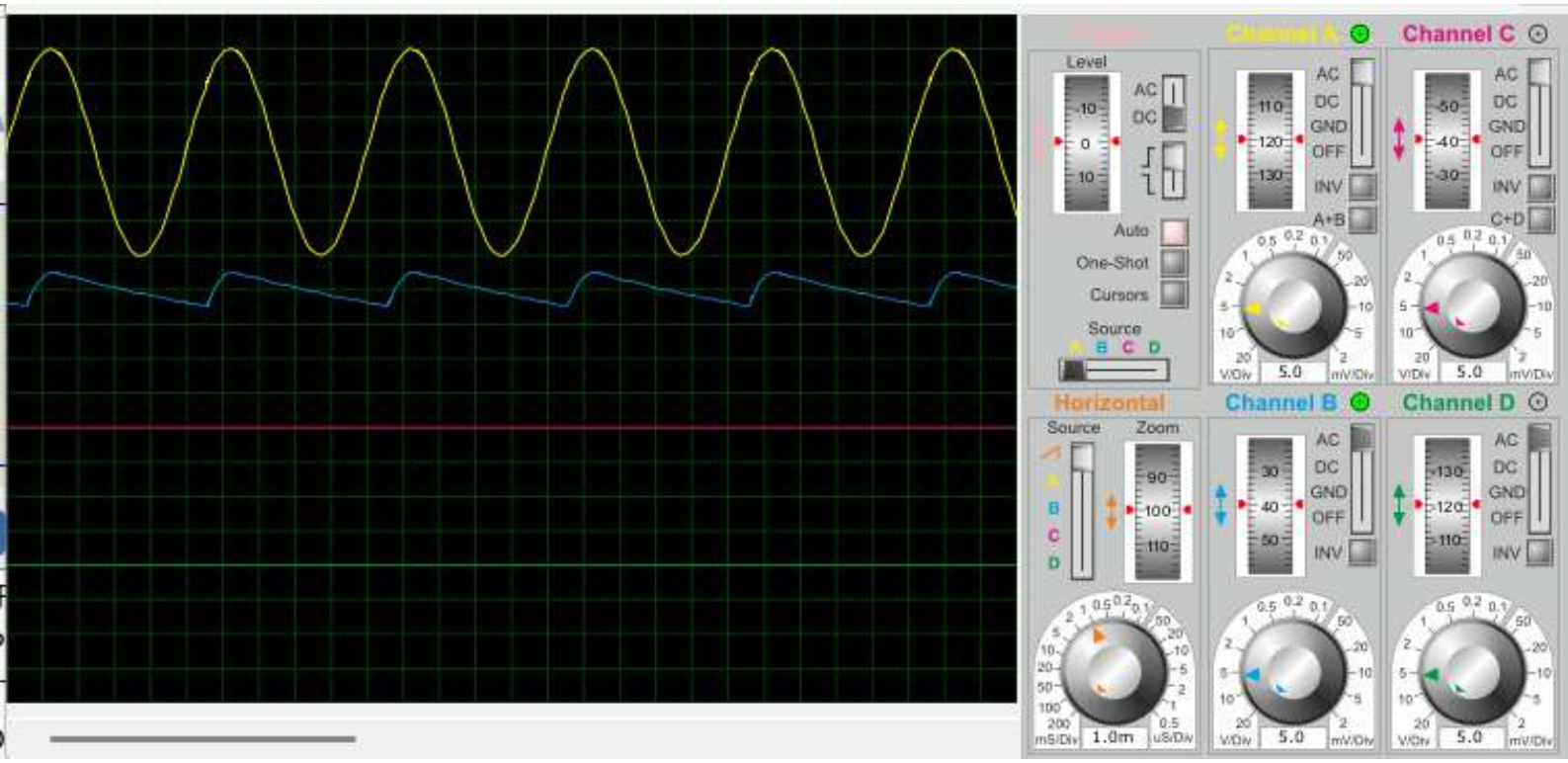

HALF-WAVE RECTIFIER
SCALE
X-axis 2unit 5μs
Y axis 3unit 10V
INPUT VOLTAGE Vi (V)
100
0
5
10
15
20
25
30
35
40
time (μs)
WITHOUT FILTER
OUTPUT VOLTAGE Vo (V)
100
0
5
10
15
20
25
30
35
time (μs)
WITH FILTER
OUTPUT VOLTAGE Vo (V)
100
5
10
15
20
25
30
35
time (μs)

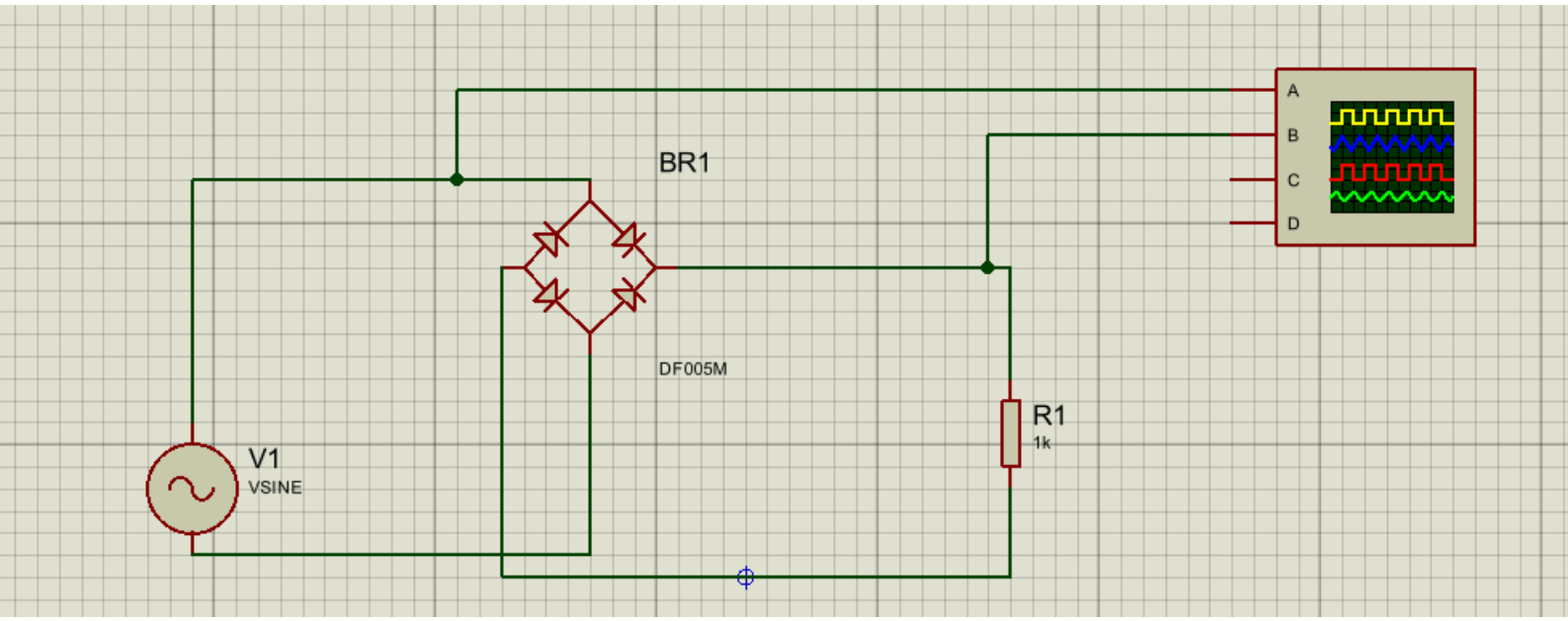

Scale
X-axis 1unit = 5μs
Y-axis 1unit = 50V
Full Wave Rectifier
Input Voltage (Vi) V
100
0
5
10
15
20
25
30
35
40
time(μs)
Without Filter
Output Voltage Vo (V)
100
0
5
10
15
20
25
30
35
40
time(μs)
With Filter
100
0
5
10
15
20
25
30
35
40
time(μs)

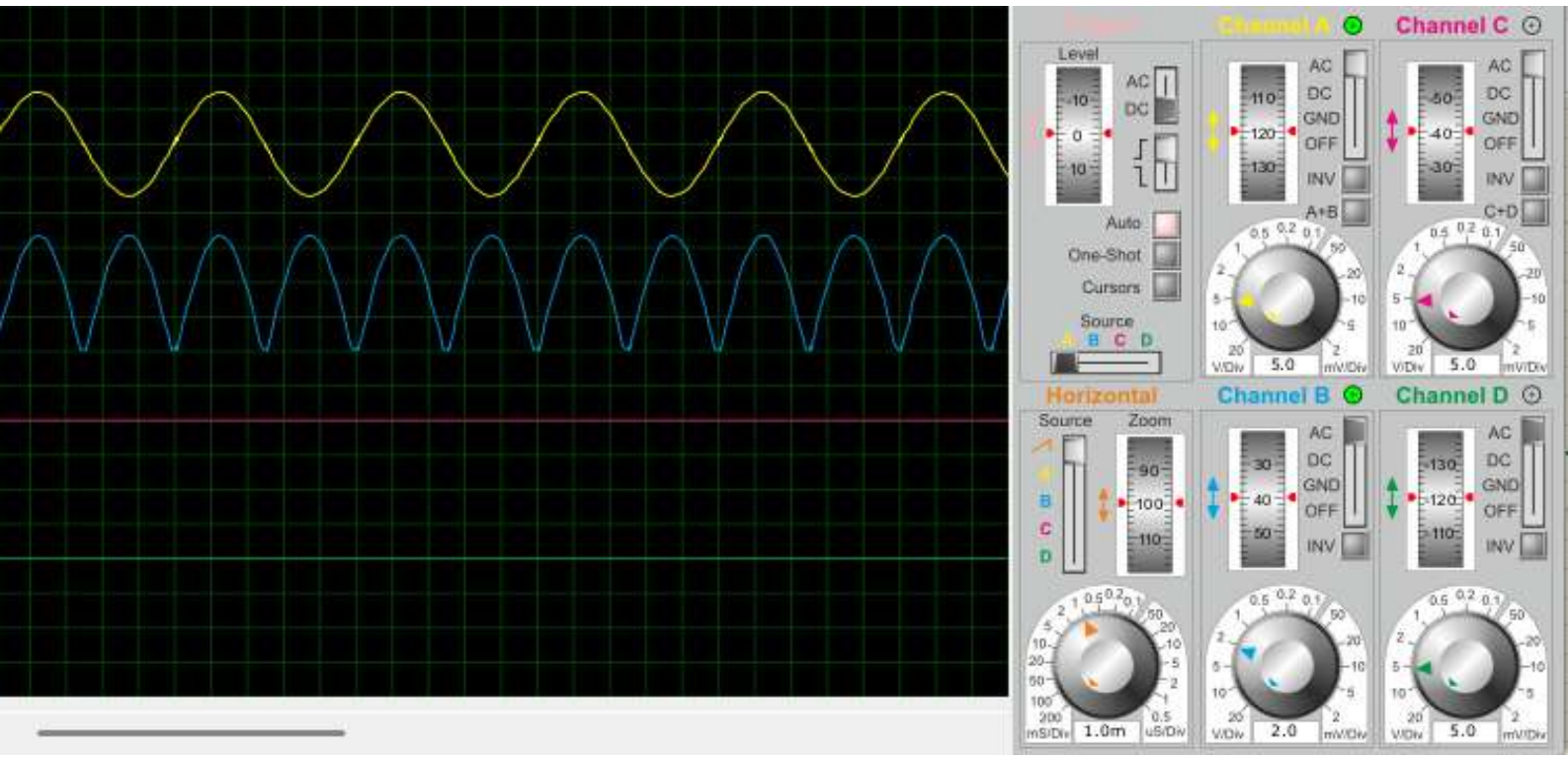

A
B
C
D
D1
DFLR1200
R1
1k
V1
VSINE

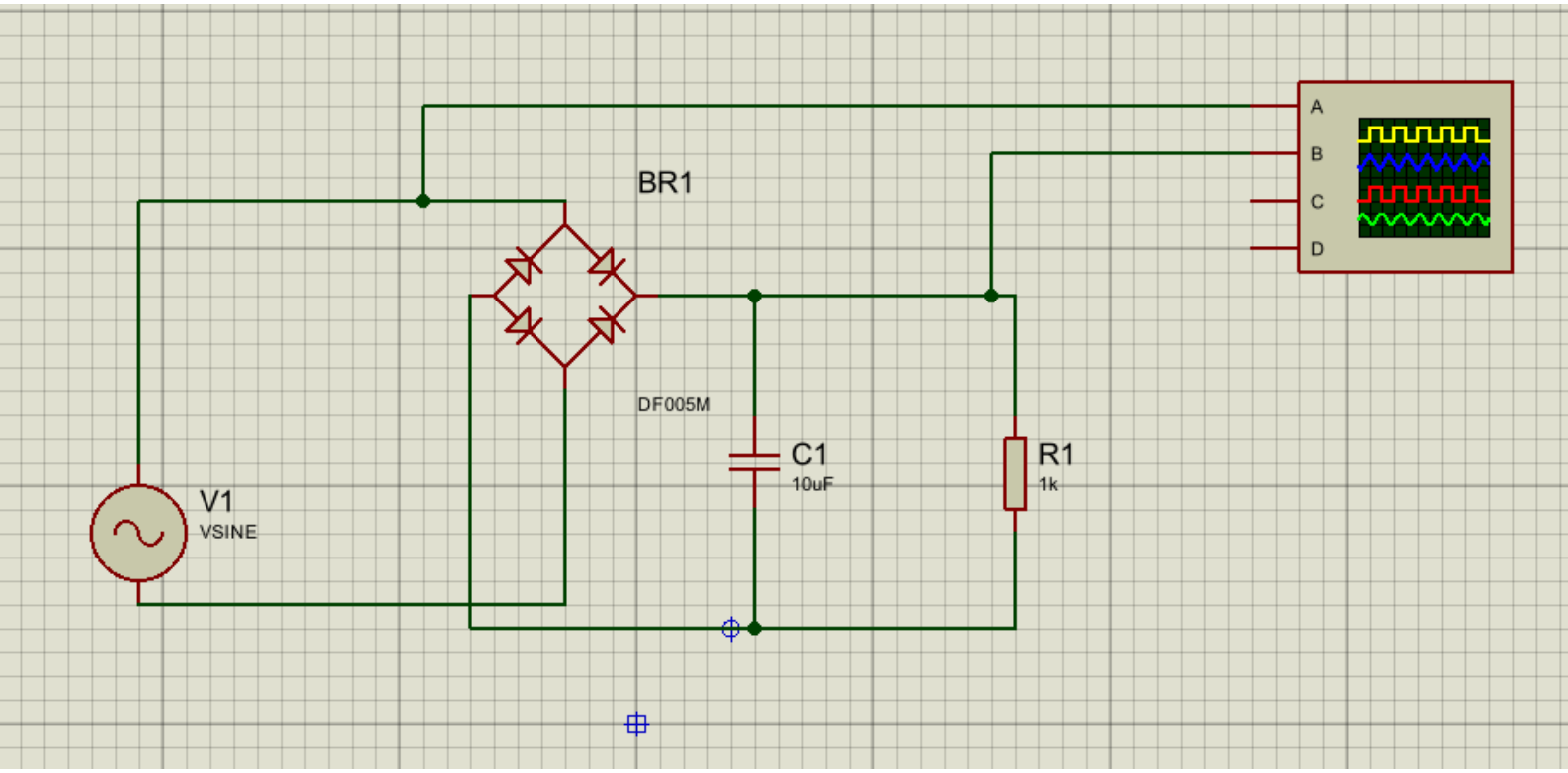

Level
AC
DC
Auto
One-Shot
Cursors
Source
A B C D
Channel A
Channel C
AC
DC
GND
OFF
INV
A+B
C+D
V/Div
5.0
mV/Div
Horizontal
Source
Zoom
Channel B
Channel D
mS/Div
1.0m
uS/Div

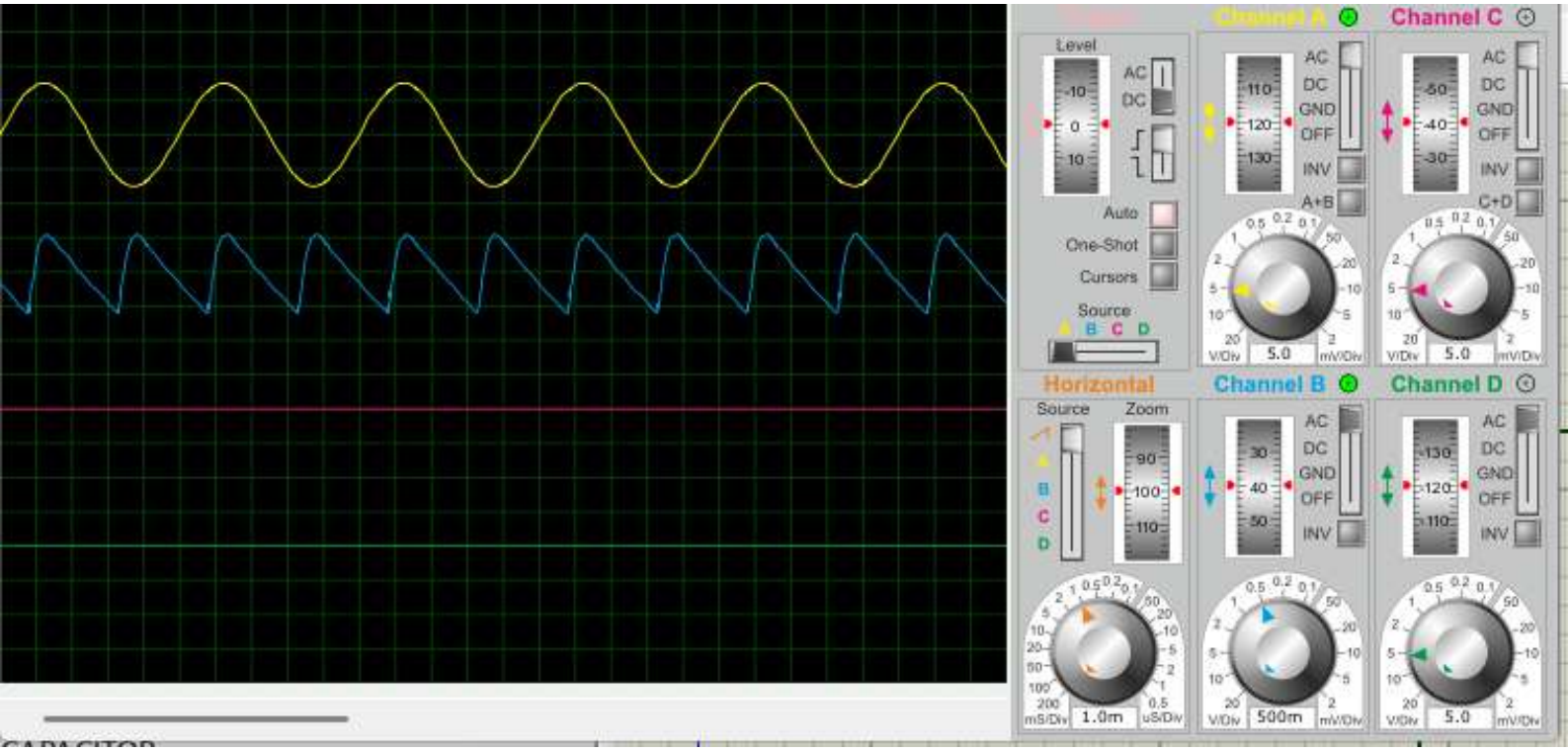

A
B
C
D
D1
DFLR1200
V1
VSINE
R1
1k
C1
10uF


Trigger
Level
AC
DC
Auto
One-Shot
Cursors
Source
A B C D
Channel A
AC
DC
GND
OFF
INV
A+B
V/Div
5.0
mV/Div
Channel C
C+D
Horizontal
Source
Zoom
Channel B
Channel D
1.0m
mS/Div
uS/Div


A
B
C
D
BR1
DF005M
R1
1k
V1
VSINE


Trigger
Level
AC
DC
Auto
One-Shot
Cursors
Source
A B C D
Channel A
AC
DC
GND
OFF
INV
A+B
5.0
V/Div
mV/Div
Channel C
C+D
Horizontal
Source
Zoom
Channel B
2.0
Channel D
1.0m
mS/Div
uS/Div


A
B
C
D
BR1
DF005M
C1
10uF
R1
1k
V1
VSINE


Channel A
Channel C
Level
AC
DC
Auto
One-Shot
Cursors
Source
A B C D
AC
DC
GND
OFF
INV
A+B
C+D
5.0
Horizontal
Source
Zoom
Channel B
Channel D
1.0m
500m
5.0