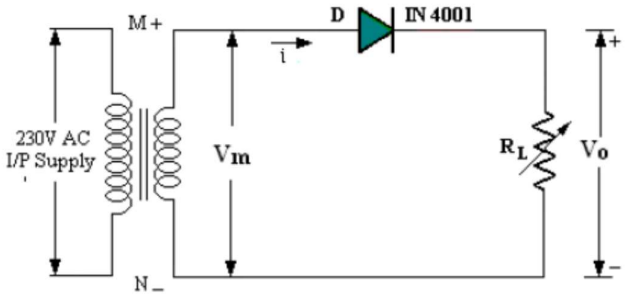
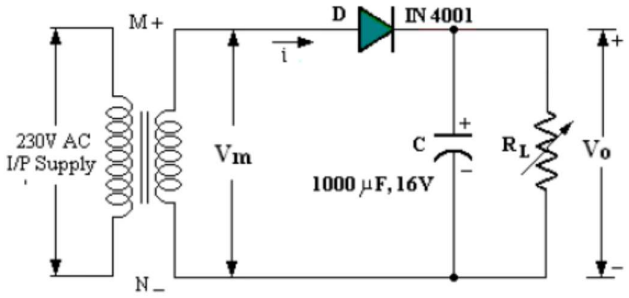
การทดลองที่ 4 RECTIFIERS

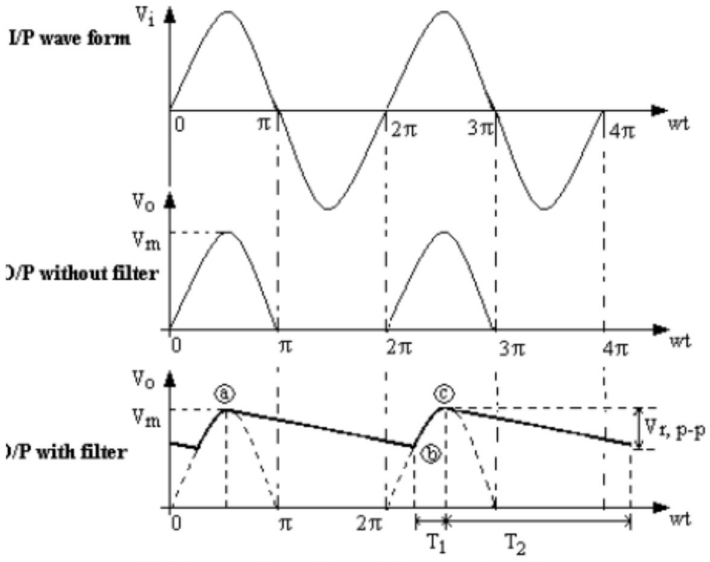
4.1 HALF-WAVE RECTIFIERS WITHOUT CAPACITOR FILTER AND WITH CAPACITOR FILTER:



Half-wave Rectifier without filter



Half-wave Rectifier with capacitor filter



Half-wave Rectifier with capacitor filter wave form

WITHOUT FILTER:

1. Connecting the circuit on bread board as per the circuit diagram
2. Connect the primary of the transformer to main supply i.e. 230V, 50Hz
3. Connect the decade resistance box and set the R_L value to 100Ω
4. Connect the Multimeter at output terminals and vary the load resistance (DRB)

from 100Ω to 1KΩ and note down the Vac and Vdc as per given tabular form
5. Disconnect load resistance (DRB) and note down no load voltage Vdc ($V_{\text{no load}}$)
6. Connect load resistance at 1KΩ and connect Channel – II of Oscilloscope at output terminals and CH – I of OSCILLOSCOPE at Secondary Input terminals observe and note down the Input and Output Wave form on Graph Sheet.
7. Calculate ripple factor

$$\gamma = \frac{V_{ac}}{V_{dc}}$$

8. Calculate Percentage of Regulation,

$$\%\eta = \frac{V_{\text{no load}} - V_{\text{full load}}}{V_{\text{no load}}} * 100\%$$

V no load =_____ V_{ac} _____V_{dc}

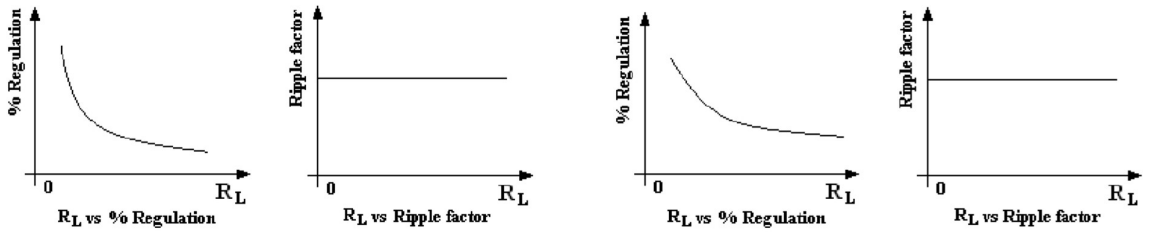
S. No.	RL (Ω)	O/P Voltage (V_o) V_{ac}(V)	V_{dc}(V)	Ripple factor	% of Regulation
1	100				
2	200				
3	300				
4	400				
5	500				
6	600				
7	700				
8	800				
9	900				
10	1K				

WITH CAPACITOR FILTER:
1. Connecting the circuit as per the circuit Diagram and repeat the above procedure from steps 2 to 8.

V no load =_____ V_{ac} _____V_{dc}

S. No.	RL (Ω)	O/P Voltage (V_o) V_{ac}(V)	V_{dc}(V)	Ripple factor	% of Regulation
1	100				
2	200				
3	300				
4	400				
5	500				
6	600				
7	700				
8	800				
9	900				
10	1K				

MODEL GRAPHS:

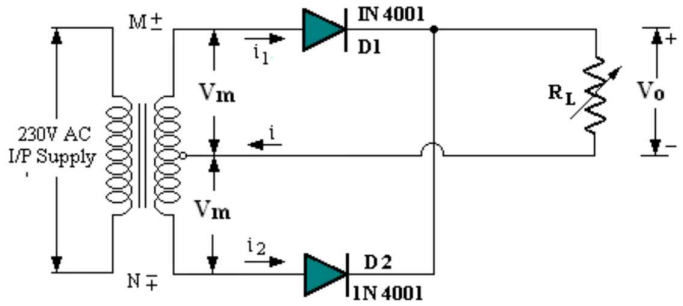


Without filter wave form

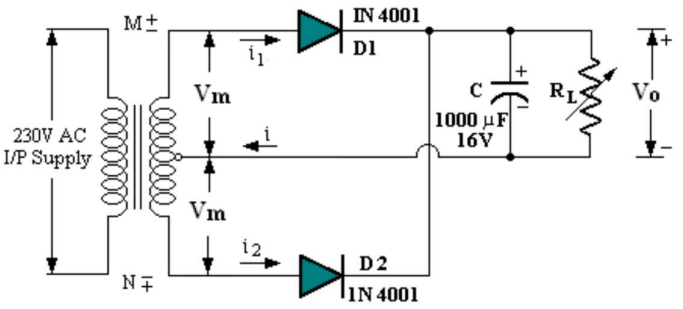
With filter wave form

RESULT: Observe Input and Output Wave forms and Calculate ripple factor and percentage of regulation in Half wave rectifier with and without filter.
Drawn Input and Output Wave forms
Without Filter:
Ripple Factor:
Regulation:
With Capacitor Filter:
Ripple Factor:
Regulation:
PRECAUTIONS:
1. Check the wires for continuity before use.
2. Keep the power supply at Zero volts before Start.
3. All the contacts must be intact.

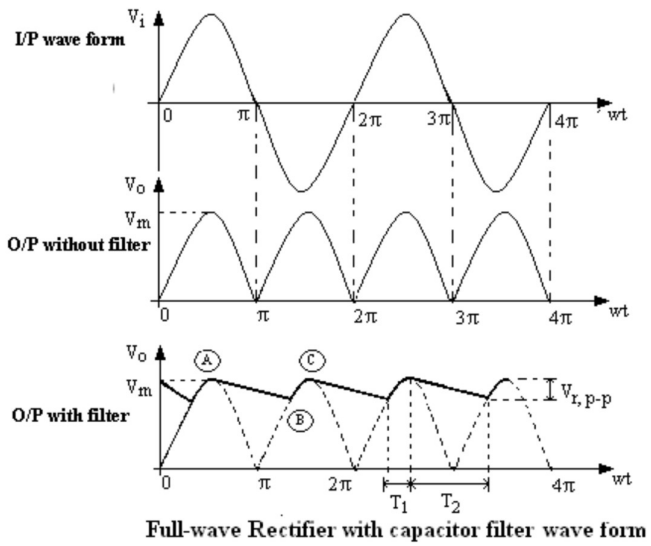
4.2 FULL-WAVE RECTIFIERS



Full-wave Rectifier without filter



Full-wave Rectifier with capacitor filter



Full-wave Rectifier with capacitor filter wave form

WITHOUT FILTER:

V no load =_____ V_{ac} _____V_{dc}

S. No.	RL (Ω)	O/P Voltage (V_o) V_{ac}(V)	V_{dc}(V)	Ripple factor	% of Regulation
1	100				
2	200				
3	300				
4	400				
5	500				
6	600				
7	700				
8	800				
9	900				
10	1K				

WITH CAPACITOR FILTER:

V no load =_____ V_{ac} _____V_{dc}

S. No.	RL (Ω)	O/P Voltage (V_o) V_{ac}(V)	V_{dc}(V)	Ripple factor	% of Regulation
1	100				
2	200				
3	300				
4	400				
5	500				
6	600				
7	700				
8	800				
9	900				
10	1K				

RESULT: Observe Input and Output Wave forms and Calculate ripple factor and percentage of regulation in Half wave rectifier with and without filter.

Without Filter:

Ripple Factor:

Regulation:

With Capacitor Filter:

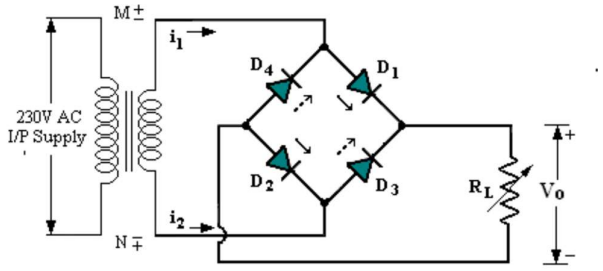
Ripple Factor:

Regulation:

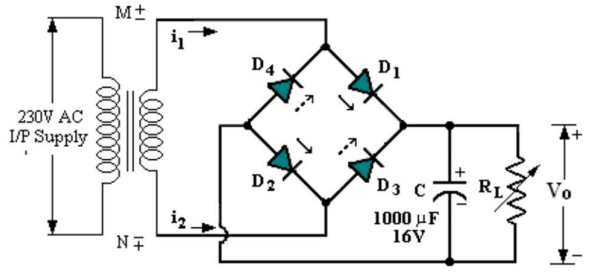
VIVA QUESTIONS:

1. What is a rectifier?
2. How Diode acts as a rectifier?
3. What is the significance of PIV? What is the condition imposed on PIV?
4. Draw the o/p wave form without filter?
5. Draw the o/p wave form with filter?
6. What is meant by ripple factor? For a good filter whether ripple factor should be high or low?
7. What is meant by regulation?
6. What is meant by time constant?
8. What happens to the o/p wave form if we increase the capacitor value?
9. What happens if we decrease the capacitor value?

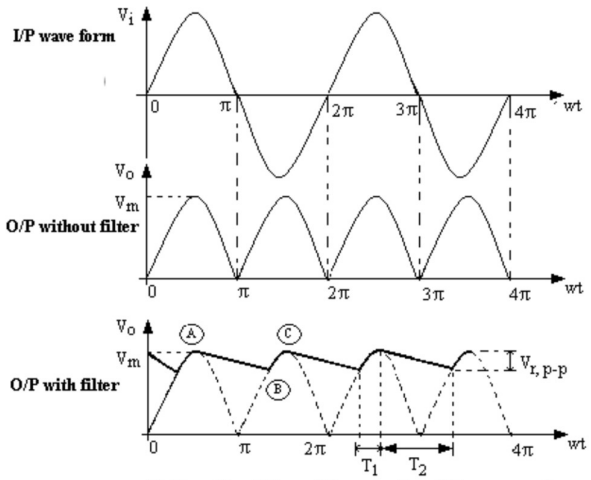
4.3 BRIDGE RECTIFIER



Bridge Rectifier without filter



Bridge Rectifier with capacitor filter



Bridge Rectifier with capacitor filter wave form

WITHOUT FILTER:

V no load =_____ V_{ac} _____V_{dc}

S. No.	RL (Ω)	O/P Voltage (V_o) V_{ac}(V)	V_{dc}(V)	Ripple factor	% of Regulation
1	100				
2	200				
3	300				
4	400				
5	500				
6	600				
7	700				
8	800				
9	900				
10	1K				

WITH CAPACITOR FILTER:

V no load =_____ V_{ac} _____V_{dc}

S. No.	RL (Ω)	O/P Voltage (V_o) V_{ac}(V)	V_{dc}(V)	Ripple factor	% of Regulation
1	100				
2	200				
3	300				
4	400				
5	500				
6	600				
7	700				
8	800				
9	900				
10	1K				

RESULT: Observe Input and Output Wave forms and Calculate ripple factor and percentage of regulation in Full-wave Bridge rectifier with and without filter.

Without Filter:
Ripple Factor:
Regulation:

With Capacitor Filter:
Ripple Factor:
Regulation:

VIVA QUESTIONS:

1. What are the advantages of Bridge Rectifier over the center tapped Rectifier?
2. What does Regulation indicate?
3. What is the Theoretical maximum value of Ripple factor of a Full-wave Rectifier?
4. What is the PIV requirement of a Diode in a Bridge Rectifier?
5. Explain the operation of Bridge Rectifier?

SUMARY