IARE
INSTITUTE OF AERONAUTICAL ENGINEERING
(An Autonomous Institute affiliated to JNTUH, Hyderabad)
Dundigal, Hyderabad - 500 043

LABORATORY WORK SHEET

Name of the Student: MADKI SAI CHARAN

Roll Number									
2	3	9	5	1	A	6	6	F	2

Class: CSM-'C' Semester: I st

Course Code: AEED03 Course Name: Electrical and Electronics Engineering Laboratory.

Name of the Course Faculty: MS M VARALAKSHMI Faculty ID: IARE 11072

Exercise Number: 12 Week Number: 12 Date: 19 January 2024.

DAY TO DAY EVALUATION:

Marks	Aim / Preparation	Algorithm / Procedure / Performance in the Lab	Source Code / Calculations and Graphs	Program Execution / Results and Error Analysis	Viva - Voce	Total
Max. Marks	4	4	4	4	4	20
Obtained	4	4	4	4	4	20

Signature of Faculty

START WRITING FROM HERE :

Aim : Examine the input and output waveforms of a half wave rectifier without and with filters. Calculate the ripple factor with load resistance of 500 Ω, 1KΩ and 10KΩ respectively. Calculate ripple factor with a filter Capacitor of 100μF and load of 1KΩ, 2KΩ and 10KΩ respectively.

Apparatus :

S.No	DEVICE	RANGE/RATING	QUANTITY IN NO.
01.	Rectifier and filter trainer Board containing.		
	a) AC Supply	(9-0-9V)	01
	b) Silicon Diodes	IN4007	07
	c) Capacitor	0.47 μF	01
02.	a) DC voltmeter	(0-20V)	01
	b) AC voltmeter	(0-20V).	01
03.	DC Ammeter	(0-50mA).	01
04.	Cathode Ray oscilloscope	(0-20MHz)	01
05.	Decade resistance box	10Ω - 100KΩ	01
06.	Connecting Wires	5A	12

ROLL NUMBER : 23951A66F2

Circuit Diagram :

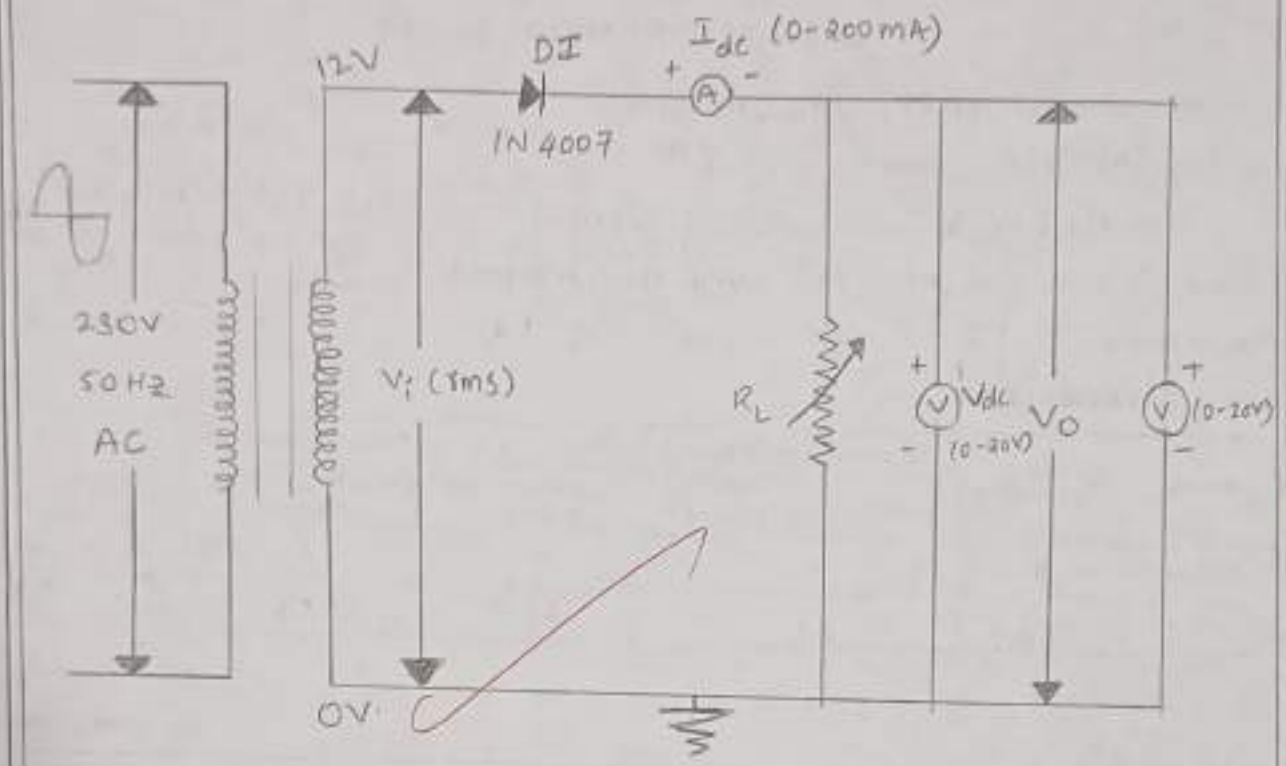


Fig (1) Half wave rectifier without filter

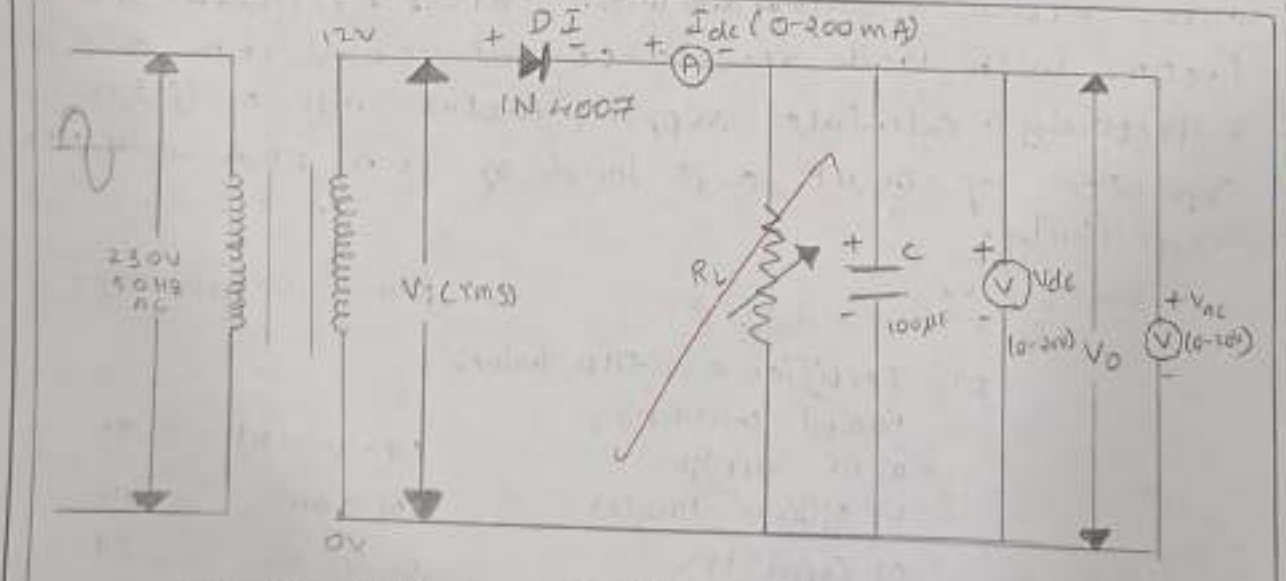


Fig (2) Half wave rectifier with filter.

ROLL NUMBER : 23951A66F2

Procedure :

Half wave Rectifier without filter

1) Connect the circuit as shown in fig (1).
2) Adjust the load resistance, R_L to 500Ω and note down the readings of input and output voltages through oscilloscope.
3) Note the readings of dc current, dc voltage and AC voltage.
4) Now, Charge the resistance the load resistance R_L to 1KΩ and repeat the procedure as above. Also repeat for 10KΩ.
5) Readings are tabulated as per the tabular column.

Half wave Rectifier with filter :

1) Connect the circuit as shown in fig (2) and repeat the procedure as for half wave rectifier without filter.

Precautions :

1) No loose contacts at the junctions.
2) meters of correct ranges must be used for precision.

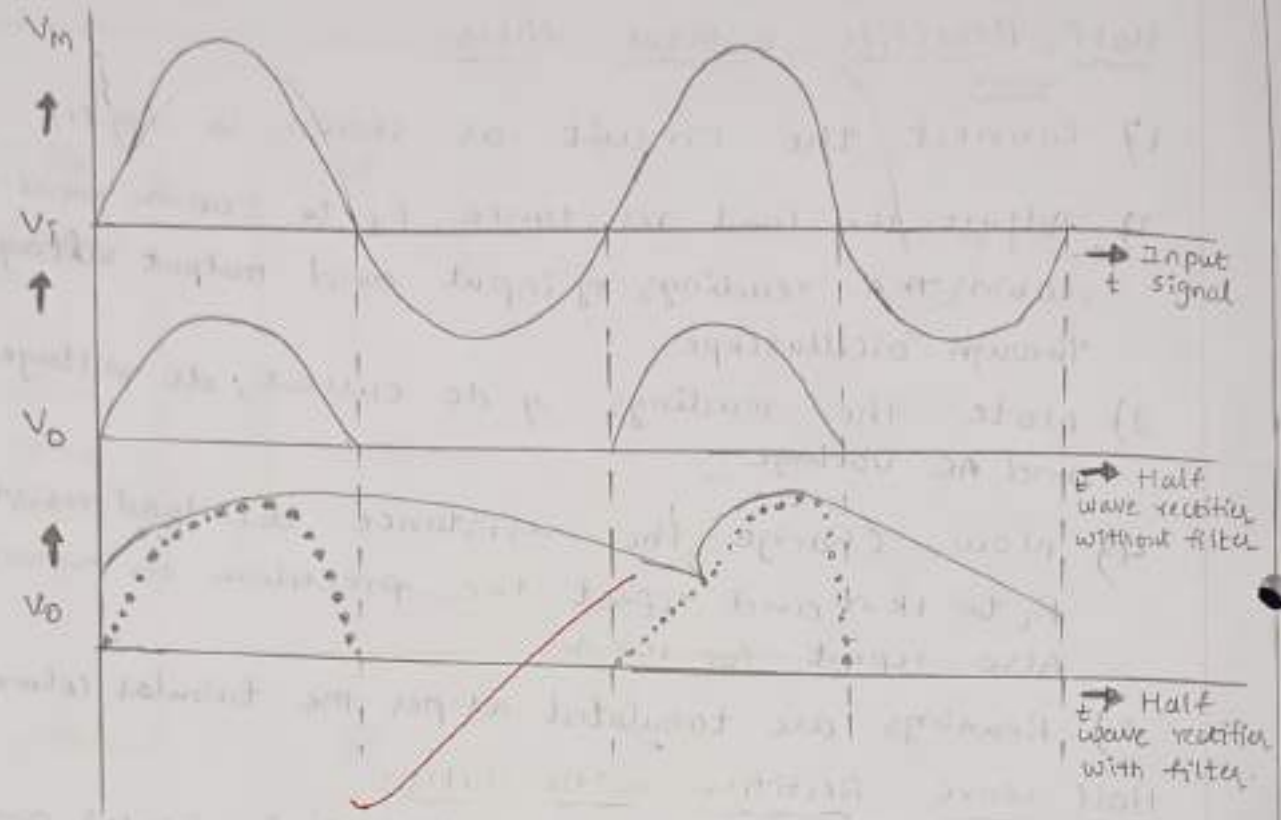
Result :

1) Input and output waveforms of half wave without /with filter are observed & plotted.
2) For halfwave without filter & at 500Ω = 1.24, 220Ω = 1.25, 10KΩ = 1.26

with filter 10KΩ, 100μF = 0.46, 22KΩ, 100μF = 0.24, 1000Ω, 100μF = 8.58

ROLL NUMBER : 2395A66F2

Expected graphs:



Tabular columns:

Half wave rectifier without filter.

S.NO.	Load Resistance (R_L)	Input voltage Peak(V_m)	output voltage Peak(V_o)	Avercage dc current (I_{dc})	Average dc voltage (V_{dc})	Rms voltage (V_{ac})	Ripple factor $\gamma = \frac{V_{ac}}{V_{dc}}$
1	100Ω	18.00	16.40	49.8	4.93	6.15	1.24
2	220Ω	20.00	18.40	26.0	5.48	6.90	1.25
3	470Ω	20.40	20.00	12.2	5.76	7.06	1.22
4.	1000Ω	20.80	20.00	5.01	3.90	7.47	1.26

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START WRITING FROM HERE :

Half wave rectifier with filter

S.NO	Load resistance (R_L)	Input voltage Peak (V_m)	output voltage Peak (V_o)	Average dc current (I_{dc})	Average dc voltage (V_{dc})	Rms voltage (V_{ac})	Ripple factor $\gamma = V_{ac}/V_{dc}$
1	100 Ω	16.40	15.60	19.2	7.72	3.64	0.46
2	220 Ω	18.00	16.80	51.3	11.20	0.70	0.24
3	470 Ω	18.80	18.00	30.3	14.1	1.35	0.09
4	1000 Ω	20.00	18.00	16.4	16.3	0.14	8.58

Result:

① Input and output waveforms of half wave rectifier with and without filters are observed & plotted

② For halfwave rectifier,

	Without filter	With filter
Vat	100 Ω = 1.24	100 Ω, 100 μF = 0.46
	220 Ω = 1.25	220 Ω, 100 μF = 0.24
	1K Ω = 1.26	1K Ω, 100 μF = 8.58