AMERICAN INTERNATIONAL UNIVERSITY BANGLADESH

Faculty of Engineering

Laboratory Report Cover Sheet

Students must complete all details except the faculty use part.

Please submit all reports to your subject supervisor or the office of the concerned faculty.

Laboratory Title: Study of Diode Rectifiers

Experiment Number: 02 Due Date: 11-10-22 Semester: _____

Subject Code: EEE____ Subject Name: Electronic devices LAB Section: C

Course Instructor: DR. Mohammad Shidujaman Degree Program: EEE

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Group Number (if applicable): 07 ☐ Individual Submission ☑ Group Submission

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Faculty comments _____

_____

Title: Study of Diode Rectifiers

Abstract: A diode rectifies an ac voltage so that it can be smoothed and converted into a dc voltage. A rectifier however can produce a constant or variable DC voltage.

Introduction: The objectives of this lab are

1) Study of Half wave rectifiers.
2) Study of full wave rectifiers

Theory and Methodology: A rectifier however cannot produce a smooth dc voltage. So the rectification block that makes the output DC voltage a smooth one follows a filter circuit. In this case the capacitor acts as a smoothing filter so that the output is nearly dc voltage.

A filtering in not perfect: there will be a remaining voltage fluctuation known an ripple, on the output voltage.

working principle of half wave rectifier

In half wave rectifier only one half cycle of Applied Ac voltage in used. Another half cycle of ac voltage in not used only one diode in used which conducts during positive cycle. During positive half cycle of the input voltage of the diode in positive compared with the cathode. Diode in in forward bian and current passes through the diode and positive half cycle developes across the resistence RL.

working principle of full wave rectifier:

The Bridge rectifier in a circuit, which converts an ac voltage to dc voltage using both half cycles of the input ac voltage. The bridge rectifier in shown in the following figure. The circuit has four diodes connected to form a bridge. The ac input voltage in applied to the diagonally opposite ends of the bridge. The ac input voltage in applied to the diagonally opposite ends to the bridge. The Load resistance in connected between other two ends of the bridge. For the positive half cycle of the input ac voltage diodes D_1 and D_2 conduct, whereas diodes D_3 and D_4 remain off. The conducting Diodes will be in series with the load Resistence R_L and hence the Load current flows through R_L. For negative half cycle

ob-tac input ac voltage, diodes D
and D_4 conduct whereas D_1 and D_2
remain obb. Thus a bi-directional
wave is converted into a unidirectional
wave.

working principle of center trapped full-wave rectifier:- A center tapped rectifier in a type of full wave rectifier that uses two diodes connected to the secondary of center tapped transformer as shown in below diagram. The input voltage is coupled through the transformer to the center-tapped secondary. Half of the total secondary voltage appears between the center tap and each of the secondary winding as shown.

for positive half of the cycle of the input voltage, the polarities on the input secondary voltage are shown in figure. This connection reverse biases D_1 and forward biases D_2. The current path is through RL and RL. Because the output current during both positive and negative portions of the input cycle are in the same direction through the load the output voltage developed across the load resistor is a full wave rectified dc voltage.

Apparatus.

NO	Apparatus	Quantity
1	Diode	4
2	10 K resistence	1
3	Project board	1
4	oscilloscope	1
5	Multimeter	1
6	Transformer	2
7	47 µf capacitor	1
8	100 µf "	1
9	chord	2

Experimental procedure:

1. connect the circuit shown in the figure-2 but without the capacitor.

2. connect the oscilloscope to observe the wave shapes of the input and output voltages.

3. Measure the output voltage by Multimeter.

4. Turn off the power supply and connect 47μf capacitor across load and observe the output voltage.

5. Measure the output voltage with a multimeter and compare it with the expire.

6. Turn off the power supply and charge the capacitor with the 200 μf capacitor

7. Repeat procedures 4 & 5.

8. Repeat procedures 1 through 7 for circuit 2,3.

Experimental Data:

Table 2: for figure-1

	V_o (oscilloscope)	V_o (multimeter)
No capacitance	10.25	7.68
47 μf	21	15.3
100 μf	20	19.5

Table 2: for figure-2

	V_o (oscilloscope)	V_o (multimeter)
No capacitance	9.75	6
47 μF	20	18.61
100 μf	20	18.6

Table 3: for figure-3

	V_0 (oscilloscope)	V_0 (multimete
No capacitance	10	6.1
47 μf	21	17
100 μf	19.5	18.9

Discussion:- All the apparatus was checked before it was taken. According to the procedures plan apparatus were setup on the circuit. 47 μF, 100 μf capacitence are present in each circuit. The data table was filled up with the value of voltage in oscilloscope and multimeter

for every step. The calculation was also done with the data table.

Question for report writing:

2. By using filter capacitance we can get a smooth dc voltage, which mean the value of dc voltage is near to the ac voltage.

4. circuit 2 is better than circuit 3 because it gives an the desire voltage which we want.

5. from the experiment we gather knowledge about Diode rectification we have learned how transformer works and why it is used.

References :-

[1] Adel S. Sedra, Kenneth C. Smith

[2] David J. Comer, Donald T Comer, Fundamentals of electronic circuit design

[3] American International university Bangladesh electronic device Lab manual.