

# Experiment 5:

## Diode Rectifier Circuits

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### In-Lab Report

#### A. Rectifier Characteristics

For each of the circuits in Figs 1, 2, and 3 adjust the load resistor to get  $I_{DC} = 50$  mA. Observe the output across the load on the oscilloscope and determine each of the quantities 1 to 4 mentioned in the Theory section above.

|                       | Half Wave Rectifier      | Full Wave center taped | Full Wave Bridge |
|-----------------------|--------------------------|------------------------|------------------|
| Figure #              | (Fig.1)                  | (Fig.2)                | (Fig.3)          |
| $V_{DC}$              | 3.17 V                   | 6.49V                  |                  |
| $V_{ripple}$ Pk-Pk    | 10.4 V                   | 10.8 V                 |                  |
| $I_{DC}$              | 50 mA                    | 50 mA                  |                  |
| $I_{peak}$            | $10.4 / 48.17 = 0.216$ A | $10.8/117 = 0.0923$ A  |                  |
| PIV                   | 11.8 V                   | 23.6 V                 |                  |
| $V_{DC}$ Open circuit | 3.52 V                   | 7.3 V                  |                  |

#### B. Full Wave Rectifier with Capacitor (Fig.4)

| C( $\mu$ F) | RL= 680 $\Omega$ |          |        |         | RL= 2.2K $\Omega$ |          |        |          |
|-------------|------------------|----------|--------|---------|-------------------|----------|--------|----------|
|             | $V_{DC}$         | $I_{DC}$ | $V_r$  | $I_F$   | $V_{DC}$          | $I_{DC}$ | $V_r$  | $I_F$    |
| 1           | 6.89V            | 0.0101 A | 10.4 V | 0.0218  | 7.11 V            | 3.23 mA  | 8.8 V  | 0.0145 A |
| 22          | 9.15 v           | 0.0134 A | 3.8V   | 0.075   | 10.2 V            | 4.63 mA  | 1.8 V  | 0.02 A   |
| 100         | 10.1 V           | 0.014 A  | 1.4 V  | 0.118 A | 10.6 V            | 4.81 mA  | 600 mV | 0.0345 A |
| 1000        | 9.87 V           | 0.0145A  | 600 mV | 0.21 A  | 10.2 V            | 4.63 mA  | 600mV  | 0.15 A   |