CHAPTER VII

CONCLUSION AND DISCUSSION

It has been attemped in this work to find out a way for designing and constructing a high efficiency, low cost, small in size and convenience in operation of an automatic voltage regulator for the alternator. A prototype voltage regulator was designed and constructed, using components available in the local market, and its characteristics were tested. All of the requirements are fulfilled. The regulator has very satisfactory characteristics. The overall voltage regulation over the ranges from noload to full load and from unity power factor to 0.8 power factor lagging is within only $\pm$ 1 percent. The transient characteristic is very good as shown in the Figure 6.7. The regulator response time is only about one cycle or 20 milisecond after the application of the transient and the recovery time is about 0.2 second.

The depression of load voltage during load application shown in Fig. 6.7 is not due to the regulation but due to the reduction in the magnitude of the harmonic when the alternator is loaded. Since the alternator under test is a single phase alternator, it produces a large magnitude of harmonic. Therefore this depression in voltage waveform is of the alternator design itself that can be seen clearly from the waveform in Figure 6.8 which was recorded from the alternator when excited separately by a DC voltage.

It can be seen from Figure 6.8 that the fundamental value of the load voltage at noload and at full load are equal even that the crests of the waves are different. The magnitude of the harmonic, however, will be considerably smaller in the three phase alternators. This is because this type of alternator the harmonics will be balanced out by the configuration of the three phase windings.

In this work an automatic voltage regulator for used with a single alternator was investigated. It is recommended that the voltage regulators used for two or more alternators in parallel should be further investigated and the design of the booster device for used with a regulator when subjected to very large low power factor loads such as a direct on line starting of a motor should also be investigated in the future too.