CHAPTER I

INTRODUCTION

1.1 Background of the Study

The trend of automotive especially in increasing engine performance is rapidly developed. The precocity of the automotive technology is a system by using electronic control unit to control combustion system. Generally, it is called electronic fuel injection (EFI) engine system. By controlling combustion system automatically, the performance of engine will increase.

The electronic control unit is able to adjust fuel system and ignition system accurately based on firing order. It is different as the old system before using electronic control unit. The old construction is called conventional engine system (carburetor) by using carburetor as adjuster of fuel and air. Fuel and air are down in to the cylinder and compressed into the combustion chamber by the rising piston. Just before top dead center (TDC) a spark at the spark plug ignites the mixture which burns rapidly across the combustion chamber in a controlled manner. The spark is resulted by breaker point from breaking and connecting primary coil process to produce the mutual induction at secondary coil, and the mutual induction will be delivered to combustion chamber based on firing order.

The electronic fuel injection works on the three basic sub-systems. These are the fuel delivery system, the air induction system, and the

electronic control system. The fuel delivery system consists of the fuel tank, fuel pump, fuel filter, fuel delivery pipe (fuel line), fuel injector, fuel pressure regulator, and fuel return pipe. The air induction system consists of the air cleaner, air flow meter, throttle valve, air intake chamber, intake manifold runner, and intake valve. The electronic control system consists of various engine sensors, electronic control unit (ECU), fuel injector assemblies, and related wiring.

By understanding the differentiation of work principles and mechanisms between conventional engine system and electronic fuel injection engine system, the systems will be experimented in one engine to get the engine performance from each work principles and mechanisms.

The experiment is done by using generator one phase as dynamometer replacement. The generator is used to produce electricity. The electricity will be used to turn the fluorescent lamp on as load that effect in torque, power, and fuel consumption at each load given.

1.2 Objective of the Study

According to the problem statement above, the research has some objectives of the study. The objective is to analysis the engine performance comparison of the conventional (carburetor) system and electronic fuel injection system including:

a. Torque

b. Power, and

c. Specific Fuel Consumption (SFC)

1.3 Benefit of the Study

Two kinds of benefits which can be gained from the study are as follows:

a. Theoretical Benefit

The study is expected to give additional information and knowledge about effect of load for torque, power and fuel consumption at an engine.

b. Practical Benefit

The study is expected to enrich the knowledge of researcher and reader about principles and mechanisms of conventional engine system and electronic fuel injection engine system.

1.4 Scope Area of the Study

The research is limited at the comparison of engine performances including power, torque, and specific fuel consumption in one engine with different principles and mechanisms of conventional engine (carburetor) system and electronic fuel injection (EFI) engine system. The engine that used is Toyota engine series 7K-E, volume 1800 cc, and power 80 Hp at 4600 rpm.