CHAPTER 3

RESEARCH METHODOLOGY

3.1 INTRODUCTION

The whole test rig for the study is described in this chapter. It covers the experimental equipment, instrument and test fuel used in this study. In addition, detailed explanation has been given on the operating test condition and particulate matter analysis. Figure 3.1 shows the flow chart of the framework strategy that comprises the approach of engine exhaust emission analysis. Within the framework strategy, this chapter is divided into six subchapters. Subchapter 3.1 is introduction. Subchapter 3.2 discusses the engine and instrumentation while subchapter 3.3 discusses the exhaust emission measurement. The purpose, procedure and specification of the equipment, instrument and material will be explained in both subchapters. Subchapter 3.4 explains the test fuel used in this experiment together with their properties. Then, in subchapter 3.5, experimental procedure conducted in this study is explained in detailed while subchapter 3.6 describes the particulate matter analysis applied to find the characteristics of particulate matter.
Experiments and tests are conducted at Faculty of Mechanical Engineering laboratory of automotives located at University Malaysia Pahang. A naturally aspirated YANMAR TF120 was used for the study. The engine is equipped with the cooling system, fuel delivery unit, data acquisition system, exhaust measurement equipment and dynamometer system. The schematic diagram of the overall engine test rig was shown in Figure 3.2.
Figure 3.2: Schematic diagram of the test rig

Figure 3.3: Test engine