CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

River is important in human life. River is very useful and has various functions in human life such as for domestics, economics, connection for one place to others place and many more. The main function of the river is to flow the water to the water storage or sea (Ahmad Abdul Ghani et al., 2013).

Hydrology deals with surface water and groundwater, their independence, and their interaction with earth materials. The study of hydrology includes all aspects of the hydrologic cycle, including atmospheric phenomena such as precipitation and evapotranspiration. The engineering hydrology includes flooding, flood analysis, flood control and seepage through earth dams. Large-scale field tests, rather than tests conducted in a laboratory, should form the basis of design, and computer assisted mathematical models to analyze data and predict hydrologic trends, although essential, should be used with discretion (Ian & D.B., 1995).
Most of the Earth’s water, 97%, resides in the ocean system, with about 2.5% on land. The atmosphere holds less than 0.01%, in spite of the fact that atmospheric water is so important to weather and climate. The annual precipitation for the earth is more than 30 times the atmosphere's total capacity to hold water. This fact indicates the rapid recycling of water that must occur between the earth's surface and the atmosphere. Distribution of earth’s water shown in Figure 1.1.

![Distribution of earth’s water](image)

**Figure 1.1:** Distribution of earth’s water

Source: H. Gleick (editor), 1993

Hydrologic Engineering Centre-Hydrologic Modelling System (HEC-HMS) had been used as a tool for the hydrologic modelling of Sungai Kuantan basin. HEC-HMS is used as hydrological model which was widely applied in many water resources studies (He et al.2007, García et al. 2008). In this study, HEC-HMS was used to determine the rainfall-runoff relationship and analyze rainfall-runoff data.

HEC-HMS is designed to simulate the precipitation-runoff processes of dendritic drainage basins. Also, the function of HEC-HMS is can be used for solving the possible problems in a wide range of geographic areas. This includes large river basin water
supply and flood hydrology, and small urban or natural watershed runoff. Relationship between rainfall and runoff will then be determined by the producing hydrograph from this (HEC-HMS) computer software (U.S Army Corps of Engineers, 2008).

1.2 OBJECTIVES OF STUDY

The objectives of this study are:

1. To carry out rainfall-runoff relationship of Kuantan River basin by using HEC-HMS.

2. To apply the rainfall-runoff analysis by using Clark method in HEC-HMS.

3. To determine discharge based on rainfall data.

1.3 SCOPES OF STUDY

Kuantan River Basin is in the district of Kuantan at the north eastern end of Pahang State in Peninsular Malaysia. It is one of the important river basins in Pahang and covers an area of 1677 km² catchment area which started from forest reserved area in Mukim Ulu Kuantan through agricultural areas, Kuantan town (state capital of Pahang) towards the South China Sea. Kuantan River Basin consists of several important tributaries and these rivers drain the major rural, agricultural, urban and industrial areas of Kuantan District and discharge into South China Sea. Figure 1.2 below shows Kuantan River basin.