2010 Paper 7 Question 1

Additional Topics

The IT industry is presently interested in minimising the power consumption associated with technology.

(a) Explain what is meant by the term *energy-proportional computing* in relation to server farms and show how it might be achieved. [7 marks]

(b) Minimising the power consumption of desktop and mobile devices has traditionally been done by adapting system components such as the CPU to support multiple power states. An alternative is to incorporate two or more chips designed to give the same result but with different power/performance characteristics and to switch between them. For example, a system may switch between a high power and a low power CPU. Compare and contrast these two approaches. [6 marks]

(c) Engineering for energy efficiency is a common task for mobile computing devices such as laptops. By considering the typical work load profiles of laptops and servers, and the environments in which they operate, discuss whether the same solutions developed for laptops are likely to be applicable to servers. [7 marks]