Operating Systems

(a) From the point of view of the device driver, data may be read from an I/O device using polling, interrupt-driven programmed I/O, or direct memory access (DMA). Briefly explain each of these terms, and in each case outline using pseudo-code (or a flow chart) the flow of control in the device driver when reading data from the device. [14 marks]

(b) From the point of view of the application programmer, data may be read from a device in a blocking, non-blocking or asynchronous fashion. Using a keyboard as an example device, describe the expected behaviour in each case. [6 marks]