

5. (a) Distinguish between high-level and low-level programming languages. Your answer should comment on the motivations, applications and characteristics of each. [4]
- (b) Microprocessors consist of a set of components that interact to provide function.
- i. Explain what is meant by the term *von Neumann architecture*. [2]
  - ii. Explain the roles of the arithmetic logic unit (ALU), program counter (PC) and instruction register (IR) in program execution. [5]
  - iii. Using an example in assembler, explain how the condition code register (CCR) is used to affect change in control flow during program execution. [4]
- (c) Control units can be designed using a hardwired approach.
- i. Explain the role of the control unit in a microprocessor. [3]
  - ii. Explain how hardwired control units operate. [4]
  - iii. Discuss the advantages and disadvantages of a hardwired control unit design. [3]