

## 1999 Paper 4 Question 6

### Computer Design

A modern processor's memory is constructed from a hierarchy of memories. Explain what the levels of the hierarchy are. [5 marks]

Why do modern processors have several registers rather than an accumulator plus one or two index registers? [5 marks]

Hand compile the following pseudo-code for both a register machine and an accumulator machine of your choice. You may invent an instruction set. Make the semantics of the code clear via comments.

```
a=0;
b=1;
for(i=0; i<5; i++) {
    a=a+b;
    b=a-b;
}
```

[10 marks]