Comparative Architectures

(a) Compare and contrast each of the following techniques for achieving instruction-level parallelism:

(i) statically-scheduled super scalar;

(ii) out-of-order speculative execution;

(iii) Very Long Instruction Word (VLIW);

(iv) EPIC (as used by IA-64).

[12 marks]

(b) Discuss hardware multi-threading, and hence the different implementation approaches that have been tried to enable a single CPU core to execute from multiple instruction streams. How can multi-threading be used to improve system performance? What are the pitfalls? [8 marks]