8 Introduction to Computer Architecture (swm11)

(*a*) What is the *power wall* and why does it lead to the idea of *dark silicon*?

[3 marks]

(*b*) What is the difference between race-to-dark (also known as race-to-sleep or race-to-halt) and dynamic voltage/frequency scaling in order to save power?

[3 marks]

(*c*) Why does dark silicon lead system-on-chip designers to incorporate accelerators? Give an example of an accelerator to illustrate your answer.   [4 marks]

(*d*) Why might systems-on-chip contain many more processor cores than the application class cores, which are typically the ones advertised? What characteristics do these cores possess?   [4 marks]

(*e*) Why do you need to perform both a row access and column read when reading data out of DRAM? What does each operation do?   [3 marks]

(*f*) DRAM can perform burst reads and writes of several words. How does the last-level cache use and benefit from DRAM burst accesses?   [3 marks]