National College of Ireland

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BSc (Hons) in Computing – Year 1 -BSHC1
BSc (Hons) in Computing, Evening – Year 1 – BSHCE1
BSc (Hons) in Business Information Systems – Year 1 – BSHBIS1
BSc (Hons) in Business Information Systems, Evening – Year 1 – BSHBISE1
BA in Management of Technology in Business - Year 1 – BAMTB1
Higher Certificate in Science in Computing Applications and Support– Year 1, HCC1
Higher Certificate in Science in Computing Applications and Support, Evening – Year 1, HCCE1

Semester Two Examinations – 2011/12

Thursday 17th May, 2012
2:00pm – 3:30pm

Computer Architecture

Dr. Tom Nolan
Dr. Thomas Newe
Mr. Ciaran O Leary
Dr. Keith Maycock

Answer **all** questions in section A and **one** question from section B.

Duration of exam: 90minutes
Attachments: Boolean Algebra Identities

Section A

1. Convert 1010 into a decimal number.
2. Convert the following number AA into a binary number.
3. How many nibbles are required to represent BAD?
4. Differentiate between the footprint of plaintext against the same text stored in .doc format.
5. What are the internal characteristics affecting computing performance?
6. What is meant by core voltage?
7. Using the Euclidean algorithm find the gcd of 17, and 51.
8. Explain the properties of an Assembly language.
9. Construct a FSM to accept the following language, L = {aa,ab,aaba,ababb}
10. Prove the following De' Morgans first law using truth tables.

(10 * 5 marks)

Section B

Question One

a. Explain the POST test in detail. **(10 marks)**

b. Compare and contrast parallel data transfer against serial data transfer. **(10 marks)**

c. Explain in detail the relationship between the BIOS and the CMOS. **(10 marks)**

d. Compare and contrast two different cooling systems that you have studied. **(10 marks)**

e. Discuss the system clock attributes in detail. **(10 marks)**

Question Two

Dell are releasing a new chip that is designed to automatically handle communication between multiple disparate mobile devices. The following function F represents the schematic for the new chip.

$$F = \overline{A+B}(BC + 1) + AA(C + B)$$

a. Draw out the circuit diagram for the above expression F. **(10 marks)**

b. Using Boolean algebra reduce F to its optimal solution. **(10 marks)**

c. Prove that your solution is valid using Truth tables. **(10 marks)**

d. How much money can you save Dell if all components cost one euro? **(5 marks)**

e. Give a detailed example of how an interrupt is handled by a CPU. **(15 marks)**