Ponce Martin 10371381 Date 30/10/2014

Family name Given name Student number

**ENS1161 Computer Fundamentals**

**Test 12**

(a) State the truth value of the proposition

( a → ~b ) → ( ~c → d )

if a = 0, b = 1, c = 1 and d = 0.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **a** | **b** | **c** | **d** | **a → ~b** | **~c → d** | **( a → ~b ) → ( ~c → d )** |
| 0 | 1 | 1 | 0 | 1 | 1 | 1 |

(b) In each of the following, there is a set and a relation defined on that set. For each indicate with "Y" or "N" whether the relation is reflexive, symmetric or transitive, and hence whether it is an equivalence relation.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Set | Relation | Reflex? | Symm? | Trans? | Equiv? |
| numbers | is greater than | N | N | N | N |
| males | is the son of | N | N | Y | N |
| people | has met | Y | Y | N | N |
| words | is the same length as | Y | Y | Y | Y |

(c) Find the **logical product** of the two matrices given:

|  |  |  |  |
| --- | --- | --- | --- |
| 1 | 1 | 0 | 1 |
| 0 | 0 | 0 | 1 |
| 1 | 1 | 0 | 0 |
| 1 | 0 | 0 | 1 |

|  |  |  |  |
| --- | --- | --- | --- |
| 1 | 0 | 1 | 1 |
| 0 | 0 | 1 | 0 |
| 1 | 1 | 0 | 0 |
| 0 | 0 | 0 | 1 |

|  |  |  |  |
| --- | --- | --- | --- |
| 0 | 1 | 0 | 0 |
| 1 | 0 | 0 | 0 |
| 0 | 0 | 0 | 1 |
| 1 | 0 | 0 | 1 |

=

(d) Find the sum of the two hexadecimal numbers:

BC56E

4FAB5 +

10C023

(e) What decimal number does the 16-bit 2's complement 1111 1111 1111 0011 represent?

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[ 2 + 2 + 2 + 2 + 2 = 10 marks ]