|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Question** | **Q5** |  | **Name** |  |
| **Your score** |  |  | **Student ID** |  |
| **Full score** | **15** |  |  |  |

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| EE3046 Microcomputers Theory and Laboratory, 2022 Spring Semester  **Final Exam (8051)** *Scope*: CPU design*Time*: 18:00~21:00 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| |  |  | | --- | --- | | Best viewing mode for this question sheet in Microsoft Word program |  |      |  |  | | --- | --- | | File download | 9876543210陳小美Q5.circ (This is the same as 9876543210陳小美Q4.circ, however it contains the modified 9876543210陳小美Q5 - Lib.circ.)  9876543210陳小美Q5 - Lib.circ (This is the solution to Q4.)  2022Spring-FinalExam – Q5.docx | | Answer upload | Enter your answers online. | |

Section 3：

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| Q5. (15%) Microinstruction design for 『INC A』 |

Note: 『9876543210 陳小美 Q5 – Lib.circ』is the solution to Q4.

『9876543210 陳小美 Q5.circ』is the same as 『『9876543210 陳小美 Q1.circ』, but the library is the modified 9876543210陳小美Q5 - Lib.circ.

Please design the microinstruction for 『INC A』 to be run in this circuit。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| Bit no. (Hex) | 1F | 1E | 1D | 1C | 1B | 1A | 19 | 18 | 17 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 0F | 0E | 0D | 0C | | 0B | 0A | 09 | 08 | 07 | 06 | 05 | 04 | 03 | 02 | 01 | 00 |  |  |  |  |  |  |
|  |  |  | Sel\_ opcode or operand | | Flag value for disabling offset | sel PC in (= instru. Length) | | | Sel of flag | | | En of μPC counting | Sel\_ RAM addr | | Sel\_ RAM Din | |  | En\_ RAM Addr Lat | En\_ RAM Dout Lat | Str RAM | |  |  | Sel\_ ALU Bin | | Sel\_ ALU | | | |  |  | En of Cy update | En\_ Acc update | μP code in hexa-decimal | Assembly | Machine code | Length | Cycles  (Ours) | Cycles  (Official) |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 60 | - | - | ？ | ？ | ？ | ？ | ？ | ？ | ？ | ？ | ？ | ？ | ？ | ？ | ？ | ？ | - | ？ | ？ | ？ | | - | - | ？ | ？ | ？ | ？ | ？ | ？ | - | - | ？ | ？ | ???????? | INC A | 00000100 | 1 | 1 | 1 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Please enter your answer to the following places. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 60 |  |  | X01 | | X02 | X03 | | | X04 | | | X05 | X06 | | X07 | |  | X08 | X09 | | X10 |  |  | X11 | | X12 | | | |  |  | X13 | X14 |  |  |  |  |  |  |