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| **Question** | **Q6** |  | **Name** |  |
| **Your score** |  |  | **Student ID** |  |
| **Full score** | **10** |  |  |  |

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

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| |  |  | | --- | --- | | Best viewing mode for this question sheet in Microsoft Word program |  |      |  |  | | --- | --- | | File download | 9876543210陳小美Q6.circ | | Answer upload | 9876543210陳小美Q6.circ | |

Section 3：

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| Q6. (10%) Instruction Decoder |

Assume we have designed the microinstructions of the assembly instructions shown in the table below.

We now want to adopt these two instructions in our CPU circuit.

The microinstruction of PUSH direct will be placed at the location 98H of the microprogram memory.

The microinstruction of ORL A, Rn will be placed at the location 0C3H of the microprogram memory.

**What new data have to be stored in the Instruction Decoding ROM and where will they be stored?**

Please answer the question by fill the Instruction Decoding ROM in 『9876543210陳小美Q6.circ』。

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| |  | | --- | | **PUSH direct** | | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | **C** | **AC** | **F0** | **RS1** | **RS0** | **OV** |  | **P** | |  |  |  | | --- | --- | | **Bytes** | 2 | | **Cycles** | 2 | | **Encoding** | |  |  |  | | --- | --- | --- | | 11000000 |  | direct | | | **Operation** | PUSH  SP = SP + 1  (SP) = (direct) | | **Example** | PUSH A | | |  | | --- | | **ORL A, Rn** | | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | **C** | **AC** | **F0** | **RS1** | **RS0** | **OV** |  | **P** | |  |  |  | | --- | --- | | **Bytes** | 1 | | **Cycles** | 1 | | **Encoding** | |  | | --- | | 01001nnn | | | **Operation** | ORL  A = A OR Rn | | **Example** | ORL A, R5 | |