**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ID: \_\_\_\_\_\_\_\_\_\_\_\_**

**Department of Computer Science and Engineering**

**MIDTERM EXAMINATION**

**Spring 2015**

**CSE340: Computer Architecture**

**Total Marks:** **30**  **Time Allowed: 1 hour**

* Answer **ALL** questions.
* Return the question with your answer script

Question 1

1. What do you mean by High level language, Compiler and Assembler? **4.5**
2. Define ISA and ABI. **2**
3. There are different types of instructions available in MIPS. Draw various instruction formats and also mention their types. **3.5**

Question 2

1. A circuit has four inputs A, B, C, D, representing the sixteen natural binary integers from 0000 (0) to 1111 (15). A is the most significant bit and D is the least significant bit. The output of the circuit, F, is true when the input is divisible by a multiple of 4, 5, 6, or 7, with the exception of 15, in which case the output is false. Zero is not divisible by 4, 5, 6, or 7. **6**
2. Draw the truth table to represent the algorithm
3. From the truth table obtain a simplified sum of product expression for F by means of Boolean algebraic techniques.
4. Explain how Jump address is calculated with necessary figure. **4**

Question 3

1. Design a fast adder and explain its operation.  **6**
2. Encode the MIPS instruction **subi $16,$17, 18** and **sw $16,40($17)** also find their type. **4**

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Question 1

1. What do you mean by memory hierarchy and Datapath? **3**
2. Explain various addressing scheme with necessary diagrams. **7**

Question 2

1. Design a shift register using D-FF which can perform the below functionality: **6**
   * 1. Shift Left
     2. Shift Right
     3. Store Data
     4. Clear All
2. What type of instruction is JAL? Explain its operation. **4**

Question 3

1. Explain the operation of an ALU with necessary diagram.  **4**
2. Encode the following MIPS instructions. For each instruction, you should identify the format type (R, I, or J format): **6**
   1. sll $t2, $s0, 4 #$t2=10 and $s0= 16, op=0,func=0
   2. slt $t2, $s1,100 # $s1=17,op=42
   3. add $t2, $s0, $s1 # op=0,func=32