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

**Department of Computer Science and Engineering**

**CSE340: Computer Architecture   
Spring 2014**

**Midterm Exam**

**Full Marks: 45 Time: 1 hour**

1. (a) What do you mean by datapath and memory hierarchy? 5

(b) Using IEEE754 floating addition method add 0.0581 and -0.781. 10

1. (a) There are different types of instructions available in MIPS. Draw various instruction formats and also mention their types. 6

(b) Encode the following MIPS instructions. For each instruction, you should identify the format type (R, I, or J format):9

* 1. addi $t2, $s0, 4 #$t2 is register 10 and $s0 is register 16
  2. slt $t2, $s1,100 # $s1=17,op=42
  3. ori $t2,$s0,4 #

1. (a) Our favorite program runs in **10** seconds on computer A, which has a **4 Ghz** clock. We are trying to help a computer designer build a computer, B, that will run this program in 6 seconds. The designer has determined that a substantial increase in the clock rate is possible, but this increase will affect the rest of the CPU design, causing computer B to require **1.2** times as many clocks cycles as computer A for this program. What clock rate should we tell the designer to target? 7

(b) Show the single cycle data path for the below instructions: 8

(i) addi $17,$16, 40

(ii) lw $16, 100($17)