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Department of Computer Science and Engineering

Mid-Term Examination, Autumn-2023

Course: **CSE-3521 (Computer Architecture)**

Time: **1hour and 30 Minutes** Marks: **30**

[Answer all ***three*** questions; Figures in the right hand margin indicate Marks]

Q1.	**a)**	Define Computer Architecture. Explain the subcategories of computer architecture	1+2	**CO1**
	b)	A program runs in 10 seconds on computer A, which has a 300 MHz clock. We are trying to help a computer designer build a machine, 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 machine B to require 1.2 times as many clock cycles as machine A for this program. What clock rate should we tell the designer to target?	4	**CO2**
	c)	Suppose we have two implementations of the same instruction set architecture. Computer1 has a CPI of 2.0 and a clock cycle time of 250 ps for some programs, and computer 2 has a CPI of 1.2 and a clock cycle time of 500 ps for same programs. Which computer is faster for this program and by how much?	3	**CO2**
Q2.	**a)**	State four design principles of MIPS	2	**CO1**
			4	**CO2**
	b)	Translate the following MIPS Assembly Language instructions into Machine L (i) sub $s2, $t5, 20 (ii) bne $s3, .$s1,100 (iii) sw $s7, 80($s2) (iv) slt $s4, $s6, $s7		

	c)	What is the difference between CISC and RISC computers? Or Which registers are reserved for assembler and operating system?	2	CO1
	d)	Describe the MIPS addressing mode with figure.	2	CO1
Q3.	a)	Describe the first version of division Algorithm using Flow Chart. Or Describe the Final version of Multiplication Algorithm using Flow Chart.	3	CO1
	b)	Show the IEEE 754 binary representation of the number $-0.25X_{ten}$ in single and double precision	3	CO2
	c)	Divide $5_{ten} \div 3_{ten}$ using final version of multiplication algorithm	4	CO2