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Daffodil International University

Faculty of Science and Information Technology
Department of CSE
Final Examination, Semester: Fall 2022
Course Code: CSE 411 Course Title: Computer Architecture & Organization
Section: All

Time: 02:00H **Full marks: 40**

Answer All the Questions. Figure in the right-side margin indicate full marks

1.	a.	Multiply the given unsigned binary numbers **1101*1010** and **demonstrate** the **AND** array for this multiplier.	[4]	CO2
	b.	Calculating exponentiation and trigonometric functions are harder to implement. **Illustrate** the technique which is used to solve this problem and show its working procedure in the pipeline processing where the input capacity is **4 words**.	[4]	
2.	a.	**Construct** the Pipeline for a situation where **instruction 4** is a conditional branch to **instruction 10**. Mention till when the **branch cannot be determined** and in which time unit **no instructions are completed** in the pipeline.	[4]	CO3
	b.	**Identify** the **Hazard** which will occur in the given instruction with Hazard Diagram: **I_1:** ADD R1, R2, R3 **I_2:** SUB R4, R1, R2	[4]	
	c.	Suppose you have **11 instructions** to process with **no-branch**. Assume that the instruction cycle time without pipeline is **7 milliseconds**. Now **identify** the **total time** required for a pipeline with **4 stages** to execute all the instructions and find out the **speedup factor**.	[2]	
3.	a.	**Discover** the performance factors with the memory hierarchy. State the Cache Read Operation with flowchart.	[4]	CO4
	b.	**Assume** you have a **Main Memory** which is size of **128 Byte** and a **Cache Memory** size of **16 Byte**. Each line of cache memory can hold **a block of 32 bits** at a time and each block **contain 4 data**. Now sketch the **Associative Mapping** from Cache to Main Memory with example of **Address Structure**. Also mention two **advantages and disadvantages** of **Set-Associative Mapping**.	[8]	
4.	a.	**Discover** the necessity of virtual memory and prepare the Address Translation technique of virtual memory with proper figures.	[4]	CO4
	b.	**Construct** transfer of a Paged Memory to Contiguous Disk Space (Swap in/out) with figure.	[4]	
	c.	**Analyze** the sharing process of virtual memory with proper diagrams.	[2]	