World University of Bangladesh (WUB)

Department of Computer Science & Engineering

Semester Final Examination

Program: B. Sc in CSE, **Batch:** 64B

Course Title: Digital Logic Design, **Course Code:** CSE 06193141

Time: 2.0 Hours **Marks:** 40

Answer any four of the following five questions including 1.b. and 3.a.

Section- A

1. (a) A digital clock displays time in binary. At **4:30**, what would the binary representation of the hour and minute look like? Convert these to hexadecimal format. A data transmission system uses hexadecimal codes for error checking. Analyze the advantages of hexadecimal representation over binary for a message like 10110101101110110101101110110101011011. 3+2

   (b) A robot navigation system simplifies its route calculations using F=AB+A′CF = AB + A'CF=AB+A′C. Analyze how this simplification affects the overall performance of the logic circuit. A device's memory is addressed using hexadecimal numbers. If the memory location is given as **2F3**, determine its binary and octal equivalents for programming. 2+3

2. a You're programming a microcontroller that only accepts binary input. Convert the decimal temperature reading **45°C** into binary to feed into the controller. An industrial machine pauses unexpectedly due to a glitch in its combinational circuit. Analyze the K-map for the Boolean function to identify the hazard and propose a solution. 3+2

   b A railway crossing uses a JK flip-flop to control the barrier. Analyze its behaviour if the input toggles rapidly due to sensor malfunction. A lighting system uses the Boolean function F=A+BCF = A + BCF=A+BC, where AAA is the main switch, BBB is a sensor, and CCC is a timer. Simplify FFF to reduce the circuit complexity. (CO4) 2+3

Section- B

3. a Evaluate whether a 6-bit binary system is sufficient to represent all possible levels of brightness in a lighting control system. Justify your answer. Design a digital clock that displays time in binary format with a toggle option to switch to hexadecimal representation. 3+2

   b Create an algorithm for a software application to efficiently convert any number from decimal to binary, octal, or hexadecimal, and provide pseudocode. A Boolean function F=AB+A′B′+CF = AB + A'B' + CF=AB+A′B′+C is implemented in a circuit. Evaluate the reliability of the circuit in reducing propagation delays if designed with NAND gates instead of basic gates. (CO3) 2+3

P.T.O

4.	a	Recall the binary representation for the decimal number **25.** Design a binary counter for a parking system that counts cars entering and leaving a parking lot.	3+2
	b	Define BCD (Binary-Coded Decimal) and mention one application. Explain why digital systems predominantly use binary numbers instead of decimal numbers.	2+3
5.	a	Recall the associative law for both AND and OR operations in Boolean algebra. Describe the steps to convert a decimal number into its octal equivalent using an example.	3+2
	b	What are the functions of AND, OR, and NOT gates in a logic circuit? Illustrate how an XOR gate can be used in an error-detection circuit.	2+3

World University of Bangladesh (WUB)

Department of Computer Science and Engineering

Bachelor of Science in Computer Science and Engineering

Final Examination

Course title: Web Technologies and programming **Course Code:** CSE 06132228

Batch: 64B

Time: 2 Hours **Total Marks: 40**

Answer four of the following questions including at least one from Section A
Answering CO marked questions are mandatory

Section- A

1. a. Explain the concept of the World Wide Web and how it differs from the Internet. (CO1) 5

b. Explain the purpose of data types in JavaScript, and demonstrate how to declare and use variables in a program. Apply JavaScript control structures (such as if-else) to create a program that calculates whether a number is prime. (CO2) 1+4

2. a. Describe the key differences between LAN, MAN, and WAN in terms of usage and performance. 5

b. Explain the structure and operation of the Domain Name System (DNS) in relation to web hosting. Define and illustrate the concept of IP Addressing in the context of web technologies. 3+2

Section- B

3. a. Explain the life cycle of a servlet and describe how it interacts with user requests in a Java-based web application. (CO3) 5

b. Create a JavaScript program that validates a form where the user is required to input a name, email, and phone number, and provides appropriate feedback for invalid entries. (CO4) 5

4. a. Synthesize the key differences between various cloud deployment models and discuss their relevance to web application development. 5

b. Write an SQL query to create a view that displays the total revenue from the orders table, assuming the orders table has columns product_id and quantity, and the products table has price. 5

5. a. Describe the role of virtualization in cloud computing and create a use case for how it can be implemented in hosting a web application. 5

b. Write the HTML and CSS code to create a table that is styled with alternating row colors and fixed headers. Ensure that the table is responsive for mobile devices. 5

6. a. Write an SQL query to count the number of employees in each department from the employees table where each employee has a department_id column. 5

b. Discuss the key aspects to consider before starting a website development project. Illustrate how SEO and security considerations impact the design and development process. 5