REG.NO.:

VIT
Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

SCHOOL OF COMPUTER SCIENCE ENGINEERING AND INFORMATION SYSTEMS

CONTINUOUS ASSESSMENT TEST - I

SLOT: C1+TC1+TCC1

FALL SEMESTER 2025-2026

Programme Name & Branch	**: BCA(CS)**
Course Code and Course Name	**: UBCA102L &Computer Organization and Architecture**
Faculty Name(s)	**: Dr. ALAGIRI I & Dr. Rajesh p**
Class Number(s)	**: VL2025260105754 & VL2025260105745**
Date of Examination	**: 19-Aug-2025**
Exam Duration	**: 90 minutes** **Maximum Marks: 50**

General instruction(s):

- Answer All Questions
  1. Understand data representation and micro-operations, design of the computer

Q. No	Question	M	CO	BL
1.	Convert the following hexadecimal and octal numbers directly into their binary equivalents without converting them into decimal. Maintain the binary point and explain the conversion of each digit step by step. Identify and explain any invalid digits in the given numbers. **Given:** 1. $ABCD.FG_H$ 2. 7653.23_8 3. 11111111x11111 Binary Multiplication	10	1	1
2.	Compute the following expressions using binary representation. Perform all operations directly in binary form, including handling of negative numbers using two's complement. Write the final answer in binary after completing the operation. 1. -45 – 78 2. -87 + 35 3. 78 – 35 4. 43+23	10	1	2
3.	Explain the various generations of computers by highlighting the key technologies and features introduced in each stage. Describe how the transition from vacuum tubes to transistors, then to integrated circuits and microprocessors, contributed to the evolution of computing. Mention the impact of each generation on size, speed, efficiency, and applications of computers. Also, discuss the current developments in the fifth generation, including artificial intelligence and advanced computing technologies.	10	1	1
4.	State the need for a JK flip-flop and explain how it overcomes the limitations of other flip-flops. Draw the logic diagram of the JK flip-flop and label all inputs and outputs clearly. Derive the truth table showing the output behavior for all possible input combinations. Explain the functioning of the JK flip-flop, including the toggle condition when both inputs are high.	10	1	5
5.	Derive the circuit diagram and truth table for the given Boolean expressions. The sum output is defined as Sum = A′B′Cin + A′BCin′ + AB′Cin′ + ABCin, representing cases where an odd number of inputs are 1. The carry output is given as Carry = AB + BCin + ACin, which becomes 1 when at least two inputs are high. Prepare a truth table for all combinations of A, B, and Cin. Using basic logic gates like AND, OR, NOT and XOR draw the corresponding circuit diagram.	10	1	5

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