

Course/Branch : B Tech – CSE and Allied Branches
 Subject Name : Computer Architecture and Organization Semester : III
 Subject Code : KCS302 Max. Marks : 60
 Time : 120 min

CO-1 : Illustrate and interpret the basic structure, operation of the computer system and apply the basic concepts to its components.
 CO-2 : To Apply the basic logic for arithmetic & logic unit design and summarize the floating & fixed points arithmetic operations.

Section – A (CO - 1) # Attempt both the questions # 30 Marks

Q.1: Attempt any **SIX** questions (Short Answer Type). Each question is of two marks. (2 x 6 = 12 Marks)

| Q. No. | Question | Level of Taxonomy | Course Outcome |
|--------|---|-------------------|----------------|
| A | Draw and explain Von Neumann architecture. | K1 | CO1 |
| B | Illustrate Bus Architecture their type and uses? | K1 | CO1 |
| C | Define Daisy chaining with labeled diagram | K2 | CO1 |
| D | What do you understand by stack and their type and uses. | K1 | CO1 |
| E | List the different addressing modes? Give each example | K2 | CO1 |
| F | Describe the meaning of register transfer? How it differs from memory transfer? | K2 | CO1 |
| G | Interpret the terms Computer Architecture and Organization? | K2 | CO1 |

Q.2: Attempt any **THREE** questions (Medium Answer Type). Each question is of 6 marks. (3 x 6 = 18 Marks)

| Q. No. | Question | Level of Taxonomy | Course Outcome |
|--------|--|-------------------|----------------|
| ✓ A | Illustrate the processor organization and its types. Explain each type using suitable block diagram. | K3 | CO1 |
| ✓ B | Classify the different types of bus arbitration techniques. Explain each one in brief. | K3 | CO1 |
| C | Register A holds the binary value 10011101. What is the register value after arithmetic shift? Starting from the initial number 10011101, determine the register value after the arithmetic shift left, and state whether there is an over flow. | K3 | CO1 |
| ✓ D | The 8-bit registers AR, BR, CR, and DR initially have the following values: AR = 11110010; BR = 11111111; CR = 10111001; DR = 11101010 Determine the 8-bit values in each register after the execution of the following sequence of micro-operations. AR ← AR + BR CR ← CR ⊕ DR, BR ← BR + 1 AR ← AR - CR | K3 | CO1 |
| E | A bus-organized CPU (register organized CPU) has 16 registers with 32 bits In each, an ALU, and a destination decoder. a) How many multiplexers are there In the A bus, and what is the size of each multiplexer? b) b. How many selection Inputs are needed for MUX A and MUX B? c) How many inputs and outputs are there in the decoder? d) Formulate a control word for the system assuming that the ALU has 35 operations? | Creative level | CO1 |

Section – B (CO - 2) # Attempt both the questions # 30 Marks

Q.3: Attempt any SIX questions (Short Answer Type). Each question is of two marks. (2 x 6 = 12 Marks)

| Q. No. | Question | Level of Taxonomy | Course Outcome |
|--------|--|-------------------|----------------|
| A | Discuss a Full adder with its truth table. | K2 | CO2 |
| B | What do you understand by ALU? | K1 | CO2 |
| C | What do you understand by MUX? | K1 | CO2 |
| D | Find the 2's Complement of $(-19)_{10}$ | K2 | CO2 |
| E | List the drawbacks of ripple carry adder. | K1 | CO2 |
| F | Perform the Circular Right and Circular left shift for 1100101. | K2 | CO2 |
| G | Add -35 and -31 in binary using 8-bit registers in signed 1's complement and signed 2's complement form. | K2 | CO2 |

Q.4: Attempt any THREE questions (Medium Answer Type). Each question is of 6 marks. (3 x 6 = 18 Marks)

| Q. No. | Question | Level of Taxonomy | Course Outcome |
|---------------------------------------|--|-------------------|----------------|
| <input checked="" type="checkbox"/> A | Construct a carry look ahead adder using a full adder | K3 | CO2 |
| <input checked="" type="checkbox"/> B | Explain Booth Algorithm with detailed flowchart and multiply $(-7) \times (+3)$ | K3 | CO2 |
| <input checked="" type="checkbox"/> C | Apply Multiplication process using booth's algorithm $(+13) \times (-15)$. | K3 | CO2 |
| D | Construct and explain the flow chart of signed and unsigned multiplication and multiply $(5) \times (-4)$. | K3 | CO2 |
| E | Show the contents of registers E, A, Q and SC during the process of multiplication of 2 binary numbers 11111(multiplicand) and 10110 (multiplier). The signs are not included. | Creative level | CO2 |