



# RAJKIYA ENGINEERING COLLEGE, AMBEDKAR NAGAR, UP

1<sup>st</sup> Sessional Examination December -2023 (Odd Semester)

Subject Name: Computer Organization &  
Architecture

Max Marks: 20

Branch & Year: IT 2<sup>nd</sup> Year

Time: 1.5 Hours

Roll 

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All questions are compulsory. The first question carries a weight of five marks, whereas the remaining questions are each allocated three marks.

| Q. No. | Questions   | CO  | Bloom's Taxonomy Level |
|--------|---|-----|------------------------|
| 1.     | a) Let the representation of a number in base 3 be 210. What is the hexadecimal representation of the number?<br>b) What is array multiplier?<br>c) What is the value of the 2's complement represented binary number 11001101 in decimal?<br>d) Design a four-bit combinational circuit decrementer using four full adders.<br>e) Find the decimal value of $SC$ in a signed magnitude multiplication algorithm with multiplier = +15 and multiplicand = -5. | CO1 | K1 K2                  |
| 2.     | Using Booth's Multiplication method to multiply decimal number (-5) and (+4).<br>OR<br>What is Bus? What is Bus arbitration? Explain various types of bus arbitration.  | CO1 | K1, K2                 |
| 3.     | Draw the bus organization for seven CPU registers. Based on that for the case of 32 register with 64 bits in each, formulate a Control word for the system assuming ALU has 63 operations   | CO1 | K1, K2                 |
| 4.     | a) Perform the arithmetic operations $(+18) + (-24)$ and $(-18) - (-24)$ in binary using signed 2's complement representation for negative numbers<br>b) Register 'A' holds the binary values 10011101. What is the register value after arithmetic shift right? Starting from the initial number 10011101 determine the register value after arithmetic shift left and state whether there is an overflow.   | CO2 | K2, K4                 |
| 5.     | Draw a diagram of four-bit bus system using three state buffers and decoder instead of multiplexers.<br>OR<br>Write a program to evaluate the arithmetic statement:<br>$X = [A - B + C * (D * E - F)] / [G + H * K]$ Using zero address and one address instructions.   | CO2 | K2, K4                 |
| 6.     | Design a 4-bit Carry- Look a-head adder and explain its operation.<br>OR<br>Represent the number $(-65.175)_{10}$ in single precision and double precision format.  | CO2 | K2, K4                 |

15  
1674 5x16  
1541