Unit-2

Arithmetic and logic unit: Look ahead carries adders. Multiplication: Signed operand multiplication, Booths algorithm and array multiplier. Division and logic operations. Floating point arithmetic operation, Arithmetic & logic unit design. IEEE Standard for Floating Point Numbers.

Q1.Explain hardware and flow chart of Booth algorithm for multiplication of signed 2's complement numbers. Also multiply **15*-12** and **-13*-9** using Booth algorithm.

Q2.Draw and explain the ALU circuit?

Q3. Write short note on IEEE standard for floating point Representation**?**

Q4. what is Shift microoperation? Explain logical shift, circular shift and arithmetic shift with example ?

Q5. Draw and Explain the block diagram of logic circuit with AND, OR, XOR and NOT gate?

Q6. What is Fast adder or carry look ahead adder ? Explain with diagram?

Q7. What is microoperation? Explain the arithmetic, logical, shift microoperation with example

Q8. Represent the following Number in IEEE floating point representation of 32-bit and 64-bit format

(i) **+1.75 and -1.75 ii. +21 and -21 (iii) -1/6 (iv) $1.5*10^2$**

Q9. What is Array multiplier? Draw and Explain the 4 –bit by 3-bit Array Multiplier ?

Q10.An 8-bit register contains the binary value 10011100. What is the register value after an Arithmetic shift right? Starting from the initial number 10011100, determine the register value
After an arithmetic shift left, and state whether there is an overflow.

Q11.Register A holds the 8-bit binary 11011001. Determine the B operand and the logic Logic microoperation to be performed in order to change the value in A to :

a. 01101101
b. 11111101

Q12. Explain floating point representation for binary numbers.

Q12. What do you mean by high-speed adder? Discuss design of higher speed adders.

Q13. Represent $(-307.1875)_{10}$ in single and double precision format.

Q14. Show the step by step multiplication process (15)*(-13) using Booth's algorithm.

Q15. Starting from initial value of R=11011101, determine the sequence of binary values in R after a logical shift left, followed by a circular shift right, followed by a logical shift right and circular shift left.

Q16. Represent $(128.25)_{10}$ in double precision.

Q17. Describe the design of a 4-bit carry look ahead adder.

Q18.Explain how Booth's algorithm is suitable for signed number multiplication. Perform the multiplication of the following using Booth algorithm -4*-5.

Q19.Discuss Booth's algorithm Multiply(-7) and (3) using Booth's algorithm.

Q20. Design a digital circuits that performs four login operations Exclusive-OR,Exclusing-NOR,NOR and NAND. Use two selection variables show logic diagram of one typical stage?

Q21. Describe the role of carry generator function in designing the fast adders.

Q22. Define Normalization and Biasing.