instruction:

Complete all questions in **2 hours.**

Group: A

1. Unit of computer capable of performing arithmetic, logical, and data manipulation operations on binary numbers is called
    a. CU
    b. ALU
    c. I/O units
    d. Processing Unit

2. Arithmetic logic unit
        I. perform arithmetic operations
        II. store data
        III. perform a comparison
        IV. communicate with input devices

    From the above Correct one is.
    a. I only
    b. II only
    c. I and II only
    d. I and III only

3. Which of the following is a component of ALU?
    a. Functional Unit
    b. Multiplexor
    c. Instruction Decoder
    d. All of the Above

4. Operations of Computer Arithmetic and logic unit is directed by
    a. ALU itself
    b. Program
    c. Control Unit
    d. Memory Unit

5. An arithmetic logic unit (ALU) is a _____ digital electronic circuit.
    a. Combinational
    b. Sequential
    c. Both
    d. None of above

6. Engineering design the of arithmetic logic unit determines the
    a. Type and a number of storing operations
    b. Type and number of logical operations
    c. Type and number of control operations
    d. Type and number of logical and arithmetic operations

7. Which is the function of Decoder?
    a. Perform logic and arithmetic operation
    b. Selects the output we want from ALU
    c. Send output choice made through the decoder
    d. None of the above

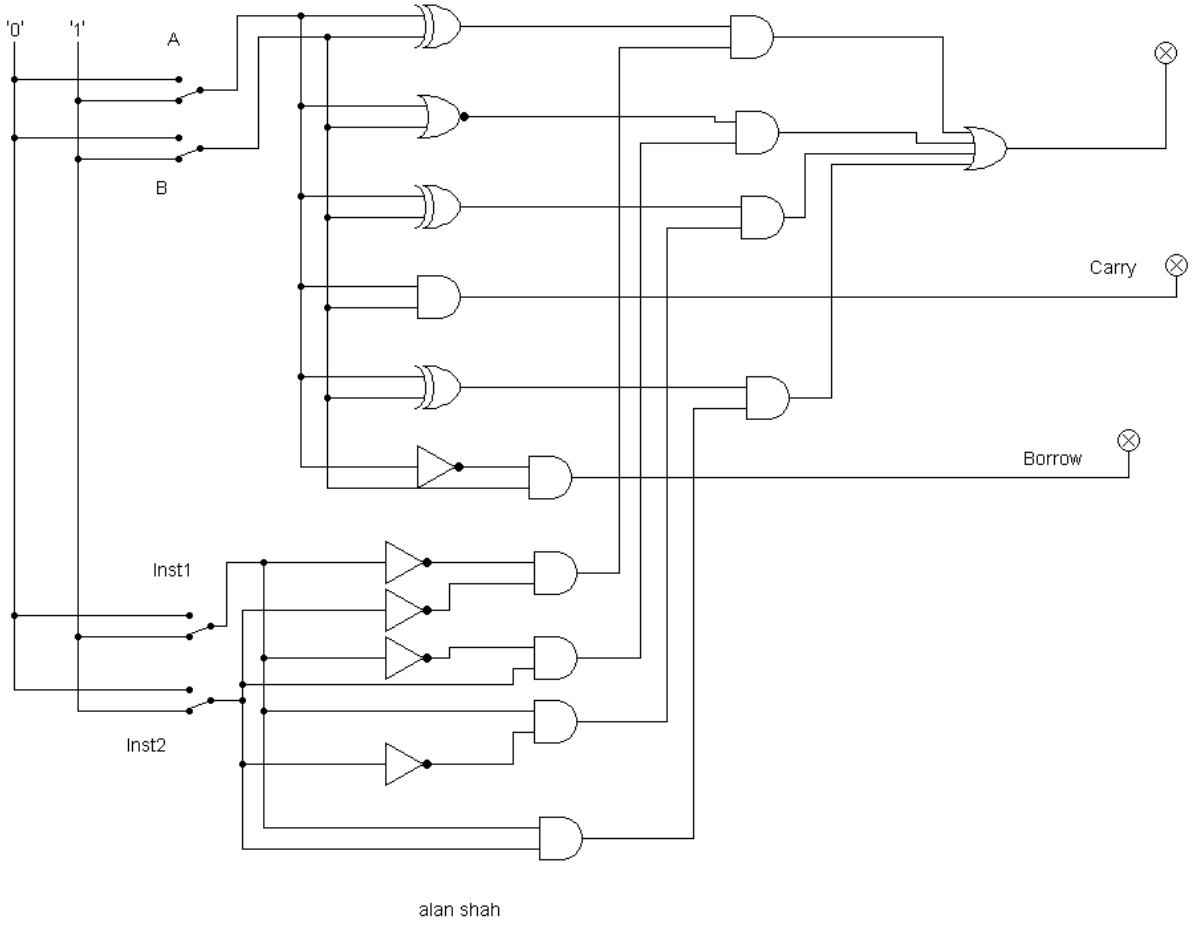
8. Which of the following is the function of Multiplexor?
    a. Perform logic and arithmetic operations
    b. Selects the output we want from ALU
    c. Send output choice made through the decoder
    d. None of the above

9. Both addition and subtraction can be performed by a single circuit using _____
    a. Multiplexor
    b. Controlled Inversion
    c. Half Adder
    d. Fuller Adder

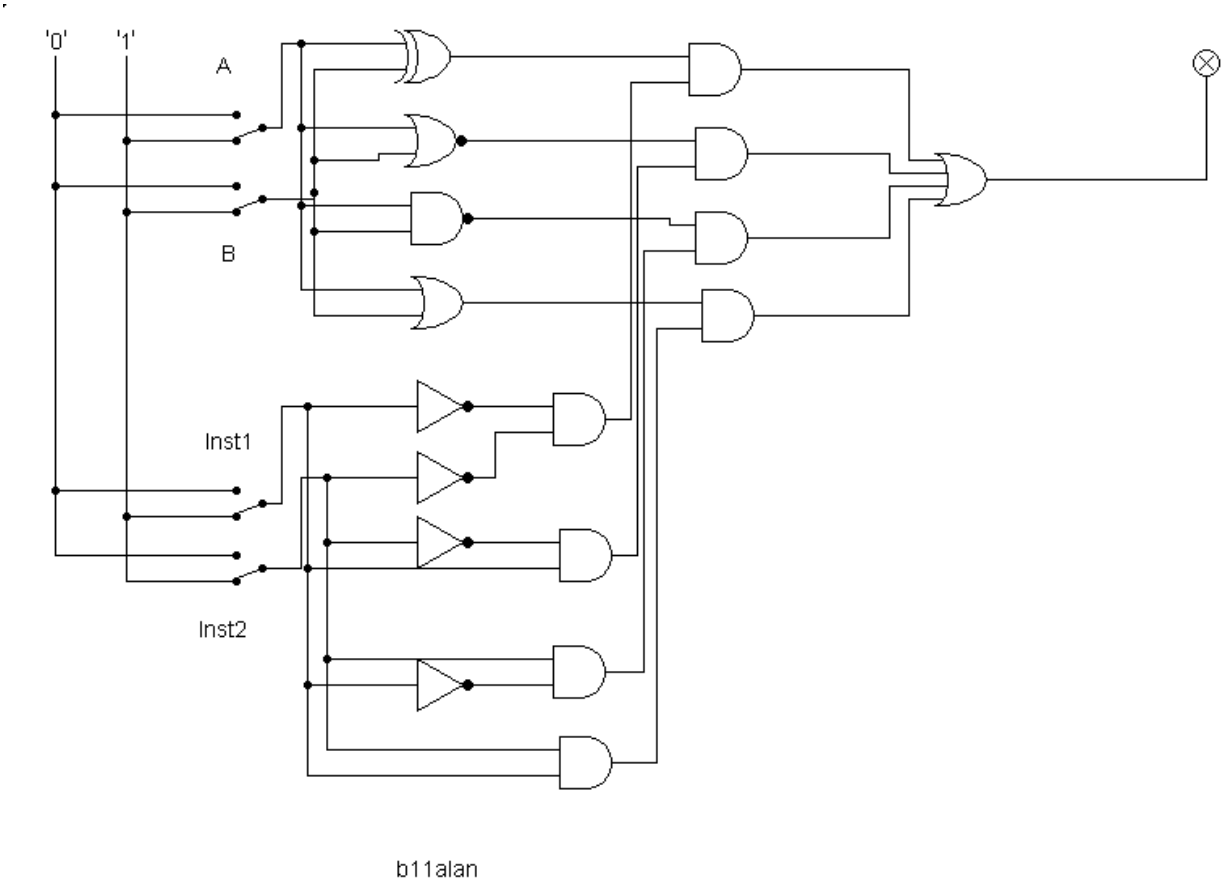
Group B

10. Design a combinational Logic circuit that selects and generates any of the following logic and arithmetic functions listed below.

A XOR B
A NOR B
A + B
A – B

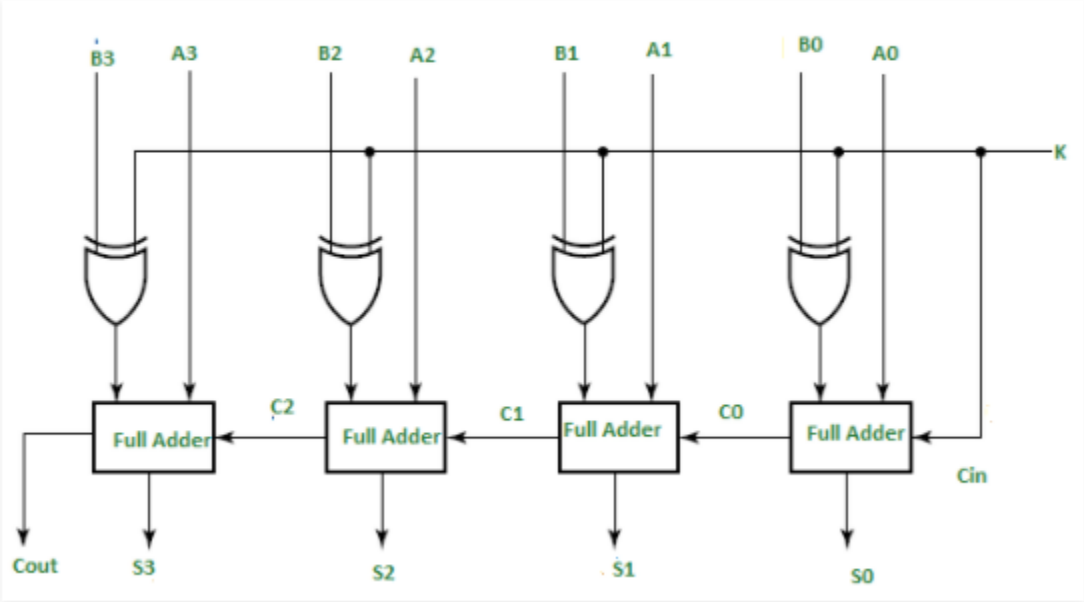


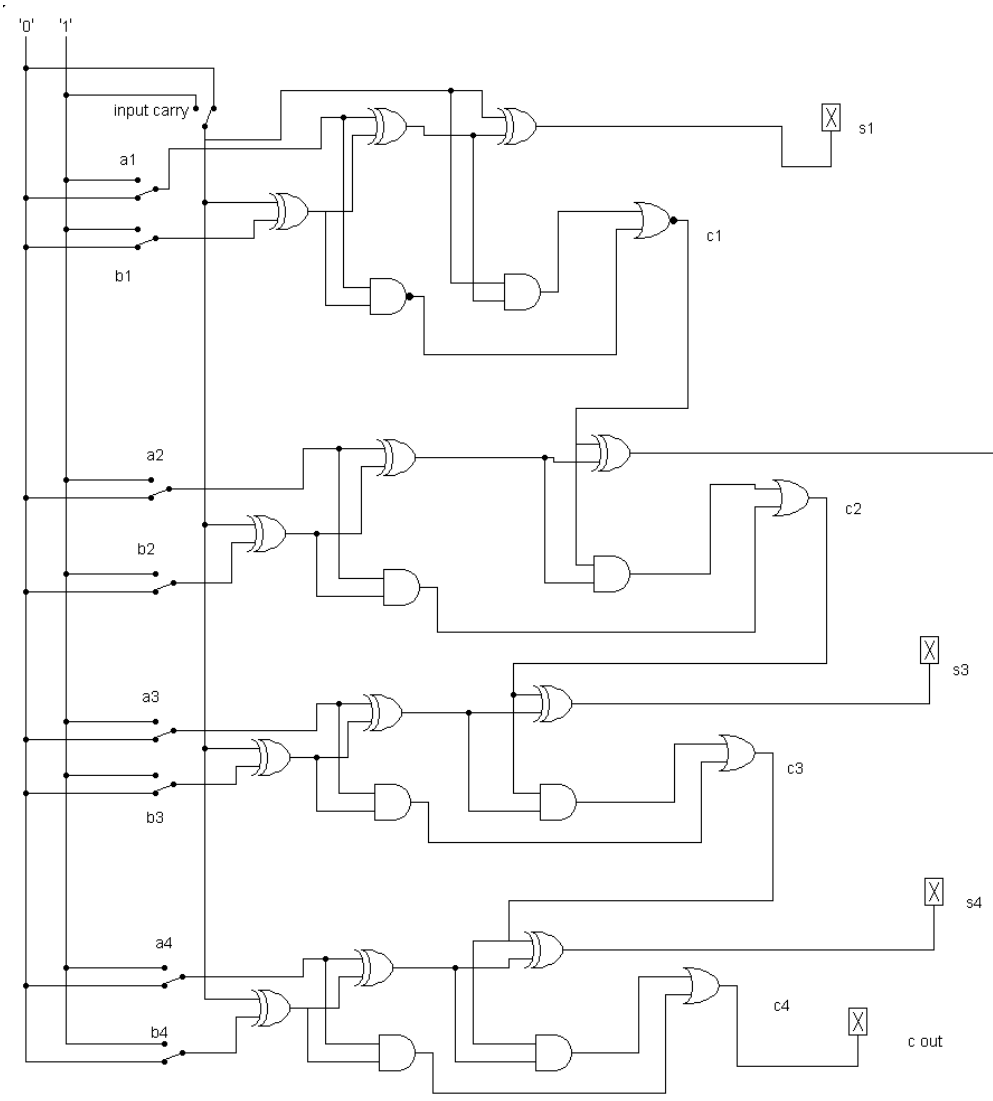
11. Design a digital circuit that performs the four logical operations of exclusive-OR, NOR, NAND and OR. Use two selection variables. Show the logic diagram of one typical stage. Discuss the working mechanism of the circuit that you have constructed.



ALU circuit is what is shown above. Functioning unit, multiplexer, and decoder are its three constituent parts. The output of the decoder governs design. Each decoder operates at a single high level. The control unit sends commands to the decoder, which reacts as necessary. EXOR, NOR, NAND, and OR are produced by four gates in a multiplexer. The AND gates of the multiplexer are connected to the output of these gates. A multiplexer's gates are proportional to the number of AND gates it contains. The final output of an ALU is provided by the connection between those AND gates and the OR gate. D2 produces a high output when its inputs, ins1 and ins2, are respectively 1 and 0.

12. Following diagram shows a 4 bit adder/subtractor. Design the circuit diagram using Logsim. Discuss how the circuit performs addition and subtraction.





The circuit schematic for the 4 bit adder and subtractor is shown above. There are four complete adders linked to one another. A controller exists. When controller is 0 or 1, summation and subtraction are carried out, correspondingly. Since it is a 4-bit adder and subtractor, A and B each have four inputs. The first complete adder is also attached to the controller. A single EXOR gate connects to each complete adder. The controller is attached to one of the EXOR gate's inputs. The EXOR gate completes the input of B and produces output when the controller is 1. However, the output is the same when the controller is set to 0. The input of a complete adder is the output of an EXOR gate. A is an additional input for the entire adder's remaining input lines. When the control is 0, it does nothing; however, if it is 1, it adds 1 to the complement of B, enabling subtraction.