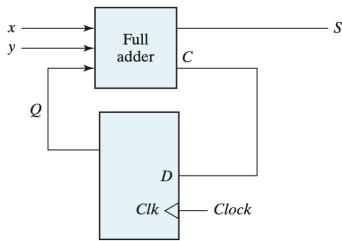


Name:

Entry No.:

Show all the steps in your solution clearly. Writing the final answer directly would not fetch any marks.

1. [1 marks] Consider the sequential circuit shown in the figure below with one D flip-flop Q , two inputs x and y , and one output S . Derive the state table and the state diagram of the sequential circuit.



2. [1 marks] A sequential circuit has two JK flip-flops A and B , and one input x . The circuit is described by the following flip-flop input equations.

$$\begin{array}{ll} J_A = x' & K_A = B' \\ J_B = A & K_B = x \end{array}$$

- (a) Derive the state equations $A(t+1)$ and $B(t+1)$.
 - (b) Draw the state table and the state diagram of the circuit.
3. [1 marks] The content of a four-bit register is initially the four-bit word 0101. The register is shifted five times to the right with the serial input being 1011001. What is the content of the register after each shift?
4. [2 marks] A sequential circuit has three flip-flops A , B , and C ; one input x ; and one output y . The state diagram is shown in the figure below. Your task is to design the circuit, by treating the unused states as don't-care conditions. Use JK flip-flops in the design.

