

**Digital Circuits and Logic Design
(CS-205, Dec-07)**

Section-A

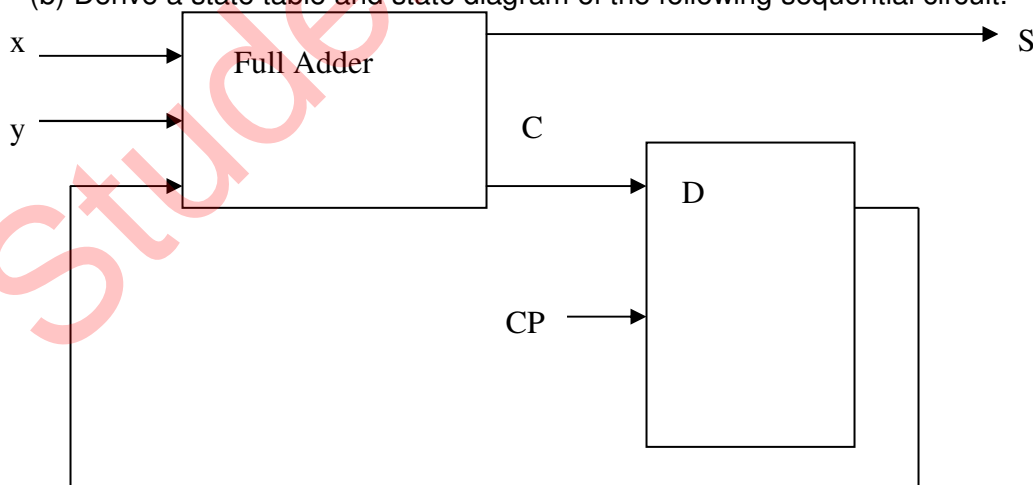
- 1). a). Find the value of x in the following.
 $(1100.1011)_2 = (x)_{10}$
- b). Realize AND gate using NOR gate only.
- c). Differentiate between synchronous and asynchronous counters.
- d). Define the term resolution of a D/A converter.
- e). What is the minimum voltage value that is considered as high stage input in case of TTL logic family.
- f). A presettable counter has eight flipflops. If the preset number is 125, what is the modulus?
- g). What are the advantages of CMOS memory chips over bipolar memory chips?
- h). Define 1's and 2's complements.
- i). Define the term resolution of an A/D inverter.
- j). Using Boolean algebraic theorems, prove that
 $A + \bar{A}B + A\bar{B} = A + B$

Section-B

- 2). Find the value of x in the following:
 - (a) $(835)_{10} = (x)_{BCD}$
 - (b) $(ETC.B)_{16} = (x)_8$
 - (c) $(1101.101)_2 = (x)_{10}$
 - (d) $(12.354)_{10} = (x)_2$
 - (e) $(BEE)_x = (2699)_{10}$
- 3). Simplify the following Boolean functions using K-maps.
 - (a) $F(A,B,C) = \Sigma(0,2,3,4,6)$
 - (b) $F(A,B,C,D) = \Sigma(1,3,5,7,9,15)$, $d(A,B,C,D) = \Sigma(4,6,12,13)$
- 4). Draw and explain the operation of TTL inverter.
- 5). Implement the following Boolean function with a multiplexer.
 $F(A,B,C,D) = (0,1,3,4,8,9,15)$
- 6). Draw the circuit diagram of a mod-5 counter and convert it into decade counter.

Section-C

- 7). Name and discuss the various types of semiconductor memories.
- 8). (a) Write a short note of Bus structures.
- (b) Derive a state table and state diagram of the following sequential circuit.



- 9). (a) Find the output voltage from a 5 bit ladder that has a digital input of 11010. Assume that 0=0v and 1 = +10v
- (b) Write a short note on VLSI design.

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