

**B.TECH. COMPUTER SCIENCE AND  
ENGINEERING (BTCSVI)**

**Term-End Examination**

**June, 2013**

**BICS-009 : LOGIC DESIGN**

*Time : 3 hours*

*Maximum Marks : 70*

---

*Note : (i) All questions carry equal marks.*

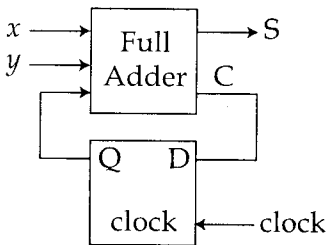
*(ii) Assume suitable missing data if any.*

*(iii) Attempt any seven questions.*

---

1. (a) Explain universal property of logic gates. 5  
Implement all logic gates using universal logic gates.
- (b) Implement the following Boolean function 5  
with NAND gates :  
 $F(x, y, z) = \Sigma(1, 2, 3, 4, 5, 7)$
2. (a) Design a three input, one output minimal 5  
two level gate combinational logic that has a logic 1 output when the majority of its inputs are logic 1 and has a logic 0 output when majority of inputs are logic 0.
- (b) Implement the following function using a 5  
four to one line multiplexer :  
 $F(x, y, z) = \Sigma(1, 2, 6, 7)$

3. Add and multiply the following numbers without converting them to decimal : **10**  
 (a) Binary Numbers 1011 and 101.  
 (b) Hexadecimal Numbers 2E and 34.
4. Design and explain single combinational logic using full adders and logic gates, that can perform both, 4 bit addition and subtraction, (one operation at a time) using mode control. **10**
5. Draw the diagram of Schmitt trigger and explain its operation. What is hysteresis and how does it benefit in the Schmitt trigger ? **10**
6. (a) What do you understand by universal shift register ? Explain working of circuit using timing diagram. **5**  
 (b) Compare Asynchronous and Synchronous counter and Explain presettable counters. **5**
7. Derive the state table and state diagram of the sequential circuit shown in figure. **10**



8. Discuss Accuracy and Resolution of A/D converter. Explain dual-slope A/D converter. 10
9. Differentiate in CMOS and TTL switching circuits. Show and explain the circuit of a four input NAND gate using CMOS transistors. 10
10. Write short note on *any two* : 5x2=10
- (a) Programmable Array logic
  - (b) Monostable Multivibrator
  - (c) Arithmetic Logic unit.
-