

Tribhuvan University  
Institute of Science and Technology  
2080



Bachelor Level / First Year/ First Semester/ Science  
**Computer Science and Information Technology (CSC 111)**  
(Digital Logic)  
**(OLD COURSE)**

Full Marks: 60  
Pass Marks: 24  
Time: 3 hours.

*Candidates are required to give their answers in their own words as far as practicable.*  
The figures in the margin indicate full marks.

**Section A**

Attempt any **TWO** questions.

(2×10=20)

1. Differentiate between synchronous and asynchronous counter. Design an asynchronous Mod 12 up counter using T Flip Flop and show its timing diagram.
2. What is multiplexer? Explain 4 to 1 multiplexer along with its truth table logical expression and logic circuit. Realize 8 to 1 multiplexer using lower order multiplexers.
3. Reduce given Boolean Expression  $F(w,x,y,z)=w'xz + w'yz + x'yz$  with don't care condition as D (w, x, y, z) = wyz using K-Map and draw the suitable logic diagram and realize it with NAND gate.

**Section B**

Attempt any **EIGHT** questions.

(8×5=40)

4. Given A=39 and B=34, represent them in binary and perform the following operations:
  - a. A-B (Using 2's complement method)
  - b. A-B (Using 1's complement method)
5. Draw the circuit diagram of a D Flip Flop along with its truth table and characteristic equation.
6. Mention different types of shift registers. Explain SIPO in detail with timing diagram.
7. Implement full adder with truth table, logical expression and logic circuit.
8. Design a 2-bit magnitude comparator circuit with necessary tables and diagrams.
9. Implement basic gates using NAND and NOR gates.
10. Design 2-bit synchronous up counter using JK flip flop.
11. Explain octal to binary encoder in detail.
12. Write short notes on:
  - c. PAL
  - d. Gray Code
  - e. Edge Triggering