

Tribhuvan University
Institute of Science and Technology
2069

Bachelor Level/ First Year/ First Semester/ Science
Computer Science and Information Technology (CSc. 111)
(Digital Logic)

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.

Long Questions:

Attempt any two questions: (2 × 10=20)

1. What is decoder? Implement the following using decoder.
 - a. $F(W X Y Z) = \Sigma (0,1,3,4,8,9,10)$
 - b. $F(W X Y Z) = \Sigma (1,3,5,6,11,13,14)$
2. What do you mean by asynchronous counter? Design a mod-6 synchronous counter using T flip-flops.
3. Explain the Master-slave S-R flip-flop with logic diagram, truth table and timing diagram.

Short Questions:

Attempt any eight questions: (8 × 5=40)

4. Design a half subtractor using only NOR gates.
5. Convert the following decimal numbers into hexadecimal and octal number.
 - a. 220
 - b. 1020
6. Design a multiplexer 4*1 using only universal gates.
7. What is J-K flip flop? Explain.
8. Write a procedure to reduce K-maps.
9. What are the various types of shift registers?
10. Draw a logic diagram of a 4 bit ripple counter using D-flip flop.
11. Differentiate between combinational logic and sequential logic. List some applications of sequential logic.
12. Explain the decimal adder.
13. Write short notes on :
 - a. Programmable Logic Array
 - b. Triggering at flip-flop
 - c. Memory Unit