

Tribhuvan University
Institute of Science and Technology
2068

Bachelor Level/ First Year/ Second Semester/ Science
Computer Science and Information Technology (CSc. 151)
(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 Answer Questions:

Attempt any two questions.

(2x10=20)

1. Draw a block diagram, truth table and logic circuit of 1X16 Demultiplexer and explain its working principle.
2. Design a 3 bit synchronous counter and explain it.
3. What is magnitude comparator? Design a logic circuit for 4 bit comparator and explain it.

Short Answer Questions:

Attempt any eight questions.

(8x5=40)

4. Design a half subtractor circuit using only NAND gates.
5. Convert the following decimal numbers into Hexadecimal and Octal number.
 - a) 504
 - b) 250
6. Design an encoder using universal gates.
7. What do you mean by D-flip-flop?
8. What is sequential logic? What are the important features?
9. Simplify the Boolean function using k-maps.
$$F = X'yz + X'yz' + Xy'z + Xy'z'$$
10. Draw a parallel-in-parallel out shift register and explain it.
11. Explain the 4-bit ripple counter.
12. Explain the programmable logic array (PLA)
13. Write short notes on:
 - a) Asynchronous counter
 - b) Multiplexers
 - c) State reduction table