Tribhuvan University
Institute of Science and Technology
2067

Bachelor Level/ First Year/ Second Semester/ Science — Full Marks: 60
Computer Science and Information Technology (CSc. 151) — Pass Marks: 24
(Digital Logic) — Time: 3 hours.

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

Long Answer Questions:
Attempt any two questions. **(2x10=20)**

1. What is magnitude comparator? Design a logic circuit for a 4-bit magnitude comparator and explain it.
2. What do you mean by full adder and full subtractor? Design a 3 to 8 line decoder using two 2 to 4 line decoder and explain it.
3. What is JK master slave flip-flop? Design its logic circuit, truth table and explain the working principle.

Short Answer Questions:
Attempt any eight questions. **(8x5=40)**

4. Convert the following hexadecimal number to decimal and octal numbers
    (a) 0FFF
    (b) 3FFF
5. Design a half adder logic circuit using NOR gates only.
6. Proof the 1st and 2nd law of De Morgan's theorems with logic gate and truth table.
7. What do you mean by universal gate? Realize the following logic gates using NOR gates.
    (a) OR gate
    (b) AND gate
8. Draw a logic circuit of 4x1 multiplexer.
9. What is a flip-flop? Mention the application of flip-flop.
10. Explain the Ripple Counter.
11. Design the Decimal Adder.
12. What do you mean by shift registers? Explain.
13. Write short notes on (any two):
    (a) Decoder
    (b) Integrated circuit
    (c) PLA.