Tribhuvan University
Institute of Science and Technology
2071

Bachelor Level/ First Year/ First Semester/ Science — Full Marks: 60
Computer Science and Information Technology (CSc. 111) — 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 Questions:

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

1. What are the various types of numbering system use in the digital logic? Explain. Convert the $3EC8_{16}$ into different numbering system that you know.
2. Design the mod-6 asynchronous counter and explain with truth table.
3. What is demultiplexer? Draw its block diagram and explain its working principle.

Short Questions:

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

4. Convert the hexadecimal number 2BFC to binary and then to octal.
5. Proof the De-Morgan 1st and 2nd theorem with truth table and logic gates.
6. Simplify, the following Boolean function using three variable K-map.
   a) $F(X,Y,Z) = \sum(0,3,2,5)$
   b) $F(A,B,C) = \sum(0,2,4,5,6)$
7. Simplify the Boolean expression.
   $Y = \overline{A.B} + \overline{\bar{A} + \bar{B}}$
   prepare truth table to show that the simplified expression is correct or not?
8. Explain the PLA (Programmable Logic Array).
9. How JK flip flop can convert into a D-flip flop?
10. What do you mean by synchronous counter? Explain with truth table.
11. Draw a 3 to 8 decoder circuit and explain its operation.
12. Mention the difference types of shift register and explain.
13. Write short notes on:-
    a) CMOS
    b) Universal gates
    c) Error detection code