Tribhuwan University
Institute of Science and Technology
2071

Bachelor Level / first-semester / Science Full marks: 60 **Computer Science and Information Technology(CSC111)** Pass marks: 24 (Digital Logic) 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 are the various types of numbering systems used in digital logic? Explain. Convert the $3EC8_{16}$ into a different numbering system that you know.

2. Design the mod-6 asynchronous counter and explain with the truth table.

3. What is a 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) = ∑(0,3,2,5)

b) F(A,B,C) = ∑(0,2,4,5,6)

7. Simplify the Boolean expression. $Y = \overline{A.B} + \overline{A + B}$ **prepare a truth table to show that the simplified expression is correct or not?**

8. Explain the PLA (Programmable Logic Array).

9. How can a JK flip flop convert into a D-flip flop?

10. What do you mean by synchronous counter? Explain with a truth table.

11. Draw a 3 to 8 decoder circuit and explain its operation.

12. Mention the different types of shift register and explain.

13. Write short notes on:-

a) CMOS

b) Universal gates

c) Error detection

code