Tribhuwan University
Institute of Science and Technology
2072

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. Design and implement with logic diagram of synchronous 3 bit up down counter using J-K flip flop.

2. Design a magnitude comparator using logic gates and truth table.

3. Design a master-slave S-R flip flop with logic diagram and truth table.

Short Questions:

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

4. What do you mean by the Gray code? What are its application?

5. Covert the following:

a) $A08E. FA_{16} = (?)_{10}$

b) $AE9. BOE_{16} = (?)_{2}$

6. State and prove commutative laws, associative laws and distributive law using logic gate and truth table.

7. Show that both NAND gate and NOR gate are universal gates.

8. Prove that:

a) $\overline{ABC}\,(\overline{(A + B + C)}) = ABC$
b) $A + \bar{B}C(A + \overline{\overline{B}\,C} = A$

9. Reduce the following expression using K-map.

a) $(A+B)(A+\bar{B}+C)(A+\bar{C})$
b) $A+B(A+\bar{B}+D)(B+\bar{C})(B+C+D)$

10. How does a J-K flip flop differs from an S-R flip flop in its basic operations? Explain.

11. Differentiate between a counter a shift register.

12. Design a 4 input multiplexer using logic diagram and truth table.

13. Explain the serial-In, parallel out shift register.