Roll No. ☐☐☐☐☐☐☐☐☐☐☐ Total No. of Pages: 02

Total No. of Questions: 07

B.Sc. (IT) (2015 & Onwards)   (Sem. – 2)
DIGITAL CIRCUITS & LOGIC DESIGN
M Code: 72727
Subject Code: BSIT-204
Paper ID: [72727]

Time: 3 Hrs.   Max. Marks: 60

INSTRUCTIONS TO CANDIDATES:
1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains SIX questions carrying TEN marks each and students has to attempt any FOUR questions.**

SECTION A

1. a) What is hexadecimal number system?

   b) Write the truth table of NAND gate.

   c) What is 2's complement?

   d) What is Involution law?

   e) What is DeMorgan's law?

   f) What are the Boolean postulates?

   g) What is edge triggered flip flop?

   h) What is synchronous counter?

   i) What is latch?

   j) Differentiate between half adder and full adder.

SECTION B

2. Explain the algebraic functions and truth tables of AND, OR, NOT, XOR and NOR gates with examples.

3. a) Convert 5A (hexadecimal) to octal. Explain the steps involved.

   b) Minimize the following Boolean expression:

       $y = A. (A + B) + B. (\overline{A} + B)$

4. Explain the design of parallel binary adder and binary adder and subtractor.

5. Implement the following function with a multiplexer:

   $F (A, B, C, D) = \Sigma (0, 1, 3, 4, 8, 9, 15)$

6. a) What is race condition? Explain the procedure for removing race condition with example.

   b) Explain the steps involved in the design of asynchronous counters.

7. Draw the circuit diagram of mod-6 counter using J-K flip flops.