B.Sc. (IT) (Semester – 2nd)
FUNDAMENTAL DIGITAL ELECTRONICS
Subject Code: BITE1-206
Paper ID: [130409]

Time: 03 Hours   **Maximum Marks: 60**
Instruction for candidates:
1.   Section A is compulsory. It consists of 10 parts of two marks each.
2.   Section B consist of 5 questions of 5 marks each. The student has to attempt any 4 questions out of it.
3.   Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

Section – A   **(2 marks each)**
Q1.   Attempt the following:
      a.   Perform $(34)_{10}$ - $(13)_{10}$ by using 2's complement method.
      b.   What is the function of Half- adder?
      c.   What are the first five decimal digits in base 4?
      d.   State De-Morgan's second Theorem.
      e.   Compare latch and flip flop.
      f.   Why don't care conditions are required?
      g.   How combinational circuits are different from sequential circuits?
      h.   What is the disadvantage of J-K flip flop?
      i.   What are the applications of counters?
      j.   Realize the NAND gate using NOR gates only.

Section – B   **(5 marks each)**
Q2.   Draw the logic diagram of Master Slave J-K flip flop. Explain it in detail.
Q3.   What is gate? Discuss various elements and functions of logic gates by taking suitable examples.
Q4.   Implement the following Boolean function using 3:8 decoder and external gates.
      $F (A,B, C)=\Sigma m(2,4,5,7)$
Q5.   Find the value of x in the following:
      (a) $(111100011.0111)_2 = (x)_{10}$ (b) $(275)_{10}= (x)_2$
      (c) $(706.23)_{10} =(x)_8$ (d) $(6327.4051)_8 =(x)_{16}$
      (e) $(365)_x = (194)_{10}$
Q6.   Explain clock pulse generator using 555 Timer as Multivibrator.

Section – C   **(10 marks each)**
Q7.   Implement the following Boolean function using 8:1 multiplexer
      $F(A,B,C,D) = \Sigma m (2,4,5,7,10,14)$
Q8.   Design a Binary Adder/Subtractor circuit by using logic gates and explain it in detail.
Q9.   Design a 3-bit, Asynchronous down counter.