End Semester Examination of Semester–I, 2017
Subject : BCA
Paper : BCA–103
Full Marks : 70
Time : 3 Hrs

The figures in the margin indicate the marks corresponding to the question

Candidates are requested to give their answers in their own word as far as practicable.

Illustrate the answers wherever necessary.

Group A

1. Answer **any five** out of eight questions: 2x5=10

   i) Implement EX-NOR gate using NAND Gate.

   ii) What is the number of flip-flops required for a MOD-10 ring counter?

   iii) Define parallel and serial registers.

   iv) What is totem-pole arrangement?

   v) Difference between Analog and Digital system.

   vi) What is Race condition? How you resolve it.

   vii) Write the advantages and disadvantages of K-Map.

   viii) Draw the circuit of the following Expression y = A + B + C + D + E + F use only 2-input OR gate.

Group B

Answer **any five** out of seven questions : 5x4=20

2. How do you cascade two 2-to-4 decoders to make one 3-to-8 decoder? Draw the necessary circuit.
3. Explain briefly the characteristics of MOS logic and CMOS logic.
4. Design a SR flip-flop with the help of JK flip-flop.
5. Implement one bit full adder using 8-to-1 multiplexers (MUX).
6. i) Convert DF/F to TF/F
   ii) What is toggling? 2+2
7. Draw the circuit and shortly explain the operation of 4 bit up-ripple counter.
8. What is DTL logic? Write it's characteristics.

Group C

Answer **any four** out of six questions: 10x4=40

9. a) Draw the basic diagram of a RTL NOR gate. What are the characteristics of the RTL family? 5
   b) What is CMOS NAND gate? Draw the basic connection and explain its operation. 5
10. a) Draw the circuit diagram and explain the operation of TTL 3-input NAND gate. 5
    b) Implement the following functions using multiplexer $F(A, B, C) = \Sigma(1, 3, 5, 6)$. 5

11. a) Draw and explain the operation of a 5-bit ring counter using JK flip flops. 8

    b) Explain how a flip flop can store a data bit. 2

12. i) Design a 4X2 priority Encoder circuit, having highest priority D3. What is Encoder? 4+1

    ii) Write the differences between decoder and demuxy-circuit. 3

    iii) Find the r's and (r-1)'s complement of $(735)_8$ 2

13. Design AND, OR, NOT, EX-OR and NAND gate using suitable MUX. 2X5

14. i) Draw a 4-bit adder-subtractor circuit and explain it with proper example.

    ii) Write the differences between dual and complement.

    iii) Convert J-K F/F to T F/F. 4+3+3