

Third Semester B.E. Degree Examination, Dec.2019/Jan.2020
Analog and Digital Electronics

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Explain the construction, working and characteristics of photo diode. (06 Marks)
 b. With hysteresis characteristics explain the working of Schmitt trigger circuit (Inverting). (06 Marks)
 c. With a neat circuit diagram and mathematical analysis explain voltage divider bias circuit. (08 Marks)

OR

- 2 a. Explain the working of R-2R ladder D to A converter. (06 Marks)
 b. Explain successive approximation A to D converter. (06 Marks)
 c. Show how IC-555 timer can be used as an astable multivibrator. (08 Marks)

Module-2

- 3 a. Find the minimum SOP and minimum POS expressions for the following function using K-map. $f(A, B, C, D) = \sum_m(1, 3, 4, 11) + \sum_d(2, 7, 8, 12, 14, 15)$. (06 Marks)
 b. What are the disadvantages of K-map method? How they are overcome in Quine Mccluskey method. Simplify following function using Q-M method
 $f(A, B, C, D) = \sum_m(0, 1, 2, 5, 6, 7, 8, 9, 10, 14)$. (08 Marks)
 c. What is Map-Entered Variable method? Using MEV method simplify following function:
 $f(A, B, C, D) = \sum_m(2, 3, 4, 5, 13, 15) + dc(8, 9, 10, 11)$. (06 Marks)

OR

- 4 a. With the help of flow chart explain how to determine minimum sum of products using Karnaugh map. (06 Marks)
 b. Using Q-M method simplify the following function
 $F(A, B, C, D) = \sum_m(2, 3, 7, 9, 11, 13) + \sum_d(1, 10, 15)$. (08 Marks)
 c. With example explain Petrik's method. (06 Marks)

Module-3

- 5 a. What are hazards in digital circuits? Explain different types of hazards. (06 Marks)
 b. Implement full subtractor using 3 to 8 decoder and NAND gates. (06 Marks)
 c. Differentiate between PAL and PLA. Realize following functions using PLA. Give PLA table and internal connection diagram for the PLA (Use as many common terms as possible)
 $F_1(a, b, c, d) = \sum_m(1, 2, 4, 5, 6, 8, 10, 12, 14)$
 $F_2(a, b, c, d) = \sum_m(2, 4, 6, 8, 10, 11, 12, 14, 15)$ (08 Marks)

OR

- 6 a. What is Multiplexer? Implement following function using 8:1 MUX
 $f(A, B, C, D) = \sum_m(1, 2, 5, 6, 9, 12)$ (08 Marks)
 b. Design Hexadecimal (Binary) to ASCII Code Converter using suitable ROM. Give the connection diagram of ROM. (06 Marks)
 c. Explain Simulation and testing of digital circuits. (06 Marks)

Module-4

- 7 a. Explain the structure of VHDL program. Write VHDL code for 4 bit parallel adder using full adder as component. (08 Marks)
 b. Explain the working of SR latch using NOR gates. Show how SR latch can be used for switch debouncing. (07 Marks)
 c. Differentiate between Latch and Flip Flop. Show how SR flipflop can be converted to D flip flop. (05 Marks)

OR

- 8 a. Derive the characteristics equations for D, T, SR and JK flipflops. (08 Marks)
 b. Draw the logic diagram of master slave JK flipflop using NAND gates and explain the working with suitable timing diagram. (07 Marks)
 c. With example explain the syntax of conditional signal assignment statement in VHDL. (05 Marks)

Module-5

- 9 a. What is shift register? Explain the working of 8 bit SISO shift register using SR flip flop. (06 Marks)
 b. With the help of state graph, state and transition tables and timing diagram explain sequential parity checker. (06 Marks)
 c. Design a random counter using T flip flops whose transition graph is shown in Fig.Q.9(c). (08 Marks)

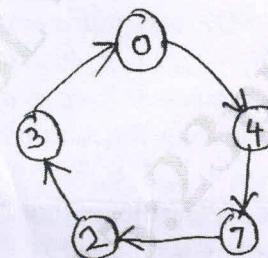


Fig.Q.9(c)

OR

- 10 a. What is register? Explain how 4 bit register with data, load, clear and clock input is constructed using D flip flops. (06 Marks)
 b. With a block diagram explain the working of n-bit parallel adder with accumulator. (06 Marks)
 c. Differentiate between Moore and Melay machines. Analyze following Moore sequential circuit for an input sequence of X = 01101 and draw the timing diagram. (08 Marks)

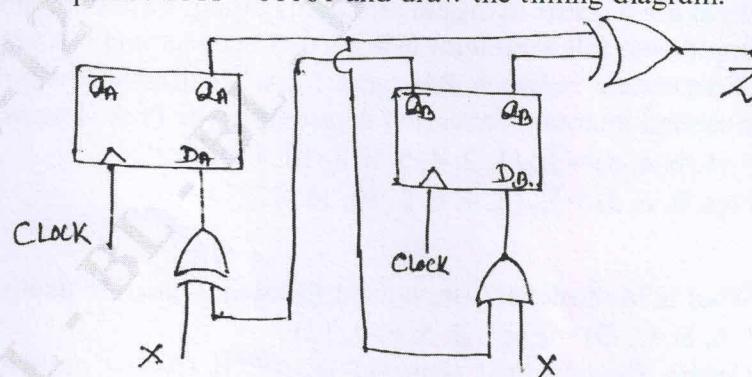


Fig.Q.10(c)

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