Roll No. 23001003083

Total Pages : 03

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December 2024
B. Tech. (Third Semester)
Digital Electronics (ESC-302)

Time : 3 Hours]   *[Maximum Marks : 75*

Note : It is compulsory to answer all the questions (1.5 marks each) of Part A in short. Answer any *four* questions from Part B in detail. Different sub-parts of a question are to be attempted adjacent to each other.

Part A

1. (a) Implement the NAND gate using the NOR gate only.   1.5

    (b) Define volatile and Non-volatile memory.   1.5

    (c) Simplify the expression using Boolean algebra :   1.5

    $$Y(A, B, C) = ABC + A\overline{B} + AB\overline{C}$$

    (d) Draw block diagram of PLA.   1.5

    (e) What are the advantages of CMOS logic families used for implementing logic gates ?   1.5

(f) Differentiate between JK and SR flip-flop.

1.5

(g) Enlist significant specifications of ADCs.

1.5

(h) What do you mean by quantization for A/D converters ? 1.5

(i) What is synchronous counter ? 1.5

(j) What is a De-multiplexer ? 1.5

Part B

2. (a) Minimize the following function using K-map. 10

$$F(A, B, C, D) = \sum m\ (0, 1, 3, 4, 7, 8, 9, 11, 14, 15)$$

(b) An 8-bit successive approximation ADC is driven by a 1MHz clock. Find the conversion time. 5

3. (a) Convert the RS flip-flop to T-flip-flop. 5

(b) Design BCD- counter using flip-flop. 10

4. (i) What are the error detection and correction codes ?

(ii) Simplify the Boolean expression using D' Morgan's law

$$Y(A, B) = (\overline{A + B})\,(\overline{\overline{A} + \overline{B}})$$

(iii) Implement Boolean expression using only universal gates.

$$Y = \overline{((A + B)C).D}$$

(iv) Interfacing CMOS and TTL Devices.

(v) Convert Boolean function into standard SOP.

$$Y(A, B, C) = AB + A\overline{C} + BC \qquad 15$$

5. (a) Explain complex programmable logic devices. **5**

(b) Briefly explain the working of Dynamic RAM cell. Also explain MROM, PROM, EPROM, EEPROM. **10**

6. (a) Implement the following function using 8:1 MUX : **10**

$$F(A, B, C, D) = \Sigma m(0, 1, 3, 4, 7, 8, 9, 11, 14, 15)$$

(b) Explain 4-bit buffer Register with suitablelogic diagram. **5**

7. Explain 3-bit R-2R ladder r type DAC, converter with suitable diagram. And give its advantages and disadvantages and give specifications of DAC. **15**