

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 0323

Roll No.

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B. Tech.

(SEM. III) ODD SEMESTER THEORY EXAMINATION
2010-11

DIGITAL ELECTRONICS

Time : 3 Hours

Total Marks : 100

Note : (1) Attempt all questions.

(2) All questions carry equal marks.

1. Attempt any **four** of the following :

(a) Convert the following decimal numbers to their binary equivalents :

(i) $(83)_{10}$

(ii) $(79.515)_{10}$

(iii) $(109.125)_{10}$

(b) Perform the following operations by using 2's complement method :

(i) $46 - 23$

(ii) $21 - 42$

(c) Perform the following subtractions of BCD numbers using 9's complement :

(i) $68 - 24$

(ii) $24 - 29$

(d) Explain with examples, how Hamming code is useful for detecting and correcting errors in digital data transmission.

- (e) Convert the following Boolean function into standard SOP and express it in terms of minterms :

$$Y(A, B, C) = AB + AC + B\bar{C}.$$

- (f) Minimize the following expression using K-map :

$$Y(A, B, C) = \Sigma(1, 2, 6, 7) + d(0, 5).$$

2. Attempt any **four** of the following :

- Design a 8-bit BCD adder.
- Implement a 16 : 1 Multiplexer using 4 : 1 Multiplexers.
- Design a BCD to Excess-3 Code Converter.
- Design a full adder using NAND gates only.
- Design a combinational logic circuit with three input variables that will produce logic 1 output when more than one input variables are logic 1.
- Design a 2-bit comparator using logic gates.

3. Attempt any **two** of the following :

- What is race-around condition ? How does it get eliminated in Master-slave J-K flip flop ? Explain.
- Design and implement a Mod-6 synchronous counter using D-flip flop.
- Design an asynchronous sequential circuit with two inputs I_1 and I_2 , and one output, Z. Initially, both inputs are equal to 0. When I_1 changes from 0 to 1, Z becomes 1. When I_2 changes from 0 to 1, Z becomes 0. Otherwise, Z is 0. Realize the circuit using J-K flip flop.

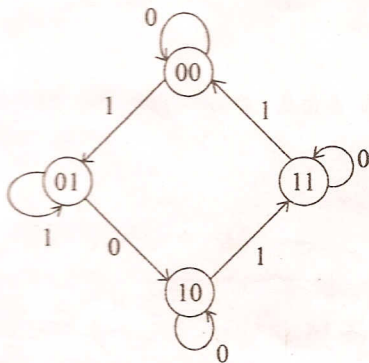
4. Attempt any **two** of the following :

- Describe the differences between the following :
 - PLA and PAL
 - Registered output PAL and GALUse logic diagrams for explanation.

- (b) Write short notes on the following :
- Sequential and Random Access memories.
 - One and multi-dimensional selection arrangement of memories.
- (c) Draw an ASM chart for a modulo-6 counter with a reset input.

5. Attempt any **two** of the following :

- (a) For the state diagram shown in figure, obtain the state table and design the circuit using minimum number of J-K FFs.



- (b) Differentiate synchronous and asynchronous sequential circuits. Explain the problem in asynchronous circuits.
- (c) What are the different types of hazards in asynchronous circuits? Differentiate static-0 and static-1 hazards with waveform.