

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

PAPER ID : 0109

Roll No.

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B.Tech.

(SEM. III) ODD SEMESTER THEORY

EXAMINATION 2013-14

DIGITAL LOGIC DESIGN



COMPUTER GEEK
compgeek.co.in

Time : 3 Hours

Total Marks : 100

Note :- (1) Attempt all questions.

(2) All questions carry equal marks.

1. Attempt any **four** parts of the following : **(5×4=20)**

(a) What is the radix called in case of decimal, binary, octal and hexadecimal number system ?

(b) Explain the rules of 1's complement addition and subtraction with suitable example.

(c) Simplify the following Boolean expression :

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

(d) Reduce the following function using K-map technique and implement using basic gates.

(e) Explain the role of codes.

(f) Explain the IEEE standard for floating point numbers.

2. Attempt any **four** parts of the following : (5×4=20)

- Design a combinational logic circuit with four input variables that will produce logic 1 output when the number of 1s in the input is even.
- Design full adder using NAND gates only.
- Draw the logic diagram of a 4 bit ALU.
- Design Binary to BCD converter.
- Design the following function using multiplexer :

$$Y(A, B, C, D) = \sum m(0, 1, 2, 5, 7, 8, 9, 14, 15).$$
- Explain the analysis and design procedure for combinational circuit.

3. Attempt any **four** parts of the following : (5×4=20)

- Draw the logic circuit of S-R flip-flop using D flip-flop.
- Explain master slave J-K flip-flop.
- Design Mod-5 counter.
- Design a 3-bit binary up/down counter. Draw its timing diagram.
- Differentiate between sequential logic circuits and combinational logic circuits.
- Explain the operation of shift register.

4. Attempt any **two** parts of the following : (10×2=20)

- Explain read and write operation of a Dynamic RAM with the help of circuit diagram.
- Explain what is ROM. Explain in detail about each of the types of ROM.

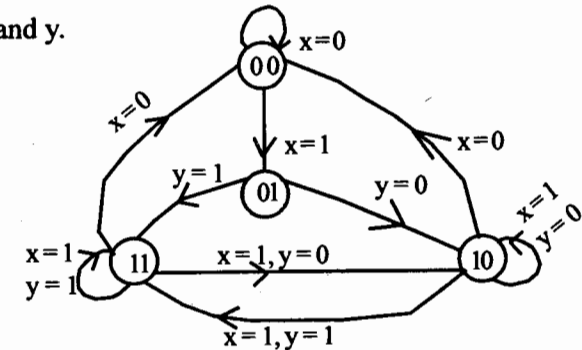


(c) Draw WRITE cycle waveform and define the following :

- Write cycle time
- Write pulse time
- Write release time
- Data set up time
- Data hold time.

5. Attempt any **two** parts of the following : (10×2=20)

- Differentiate between synchronous and asynchronous circuits. Also give example of each.
- Design an asynchronous sequential circuit with two inputs, I_1 and I_2 and, output one 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.
- Design an equivalent ASM chart for the state diagram shown in the following fig. It has four states and two inputs x and y .



State diagram