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

PAPER ID : 0109 Roll No. | | | | | | | | | | |

B.Tech.

(SEM. III) ODD SEMESTER THEORY EXAMINATION 2013-14

DIGITAL LOGIC DESIGN

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 :

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

(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.

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

(a) 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.

(b) Design full adder using NAND gates only.

(c) Draw the logic diagram of a 4 bit ALU.

(d) Design Binary to BCD converter.

(e) Design the following function using multiplexer :

$Y(A, B, C, D) = \Sigma m (0, 1, 2, 5, 7, 8, 9, 14, 15)$.

(f) Explain the analysis and design procedure for combinational circuit.

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

(a) Draw the logic circuit of S-R flip-flop using D filp-flop.

(b) Explain master slave J-K flip-flop.

(c) Design Mod-5 counter.

(d) Design a 3-bit binary up/down counter. Draw its timing diagram.

(e) Differentiate between sequential logic circuits and combinational logic circuits.

(f) Explain the operation of shift resister.

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

(a) Explain read and write operation of a Dynamic RAM with the help of circuit diagram.

(b) Explain what is ROM. Explain in detail about each of the types of ROM.

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

(i) Write cycle time

(ii) Write pulse time

(iii) Write release time

(iv) Data set up time

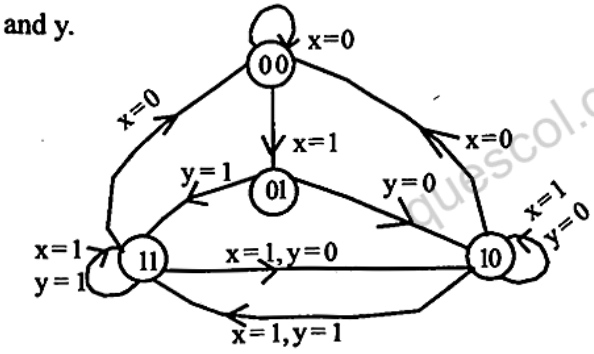
(v) Data hold time.

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

(a) Differentiate between synchronous and asynchronous circuits. Also give example of each.

(b) 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.

(c) 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

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