Student Exam No: _____

GANPAT UNIVERSITY

B.TECH SEM. IV - MECHATRONICS ENGINEERING
CBCS REGULAR EXAMINATION MAY/JUNE - 2013
2MC403/MC403 DIGITAL CIRCUITS & DEVICES

Time: 3 Hours **Total Marks: 70**

Instructions:

1). All questions are **compulsory**.
2). Figures to the **right** indicate full marks.
3). Answers to the two sections must be written in **separate** answer books.
4). Assume all necessary data.

Section - I

Que:-1 **Attempt All.** **[12]**

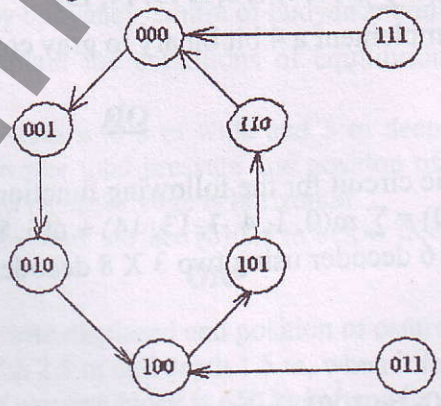
(A) Explain the master slave RS flip flop.
(B) Explain direct inputs with example.
(C) Explain successive approximation A/D converters.

OR

Que:-1 **Attempt All.** **[12]**

(A) Explain serial Transfer from register A to register B.
(B) Construct modulo 6 counter in two different ways.
(C) Explain DAC.

Que:-2 **(A)** Design a counter for following state diagram. Use JK flip flops. **[07]**



(B) Draw the logic diagram for 4-bit register with parallel load. **[04]**

OR

Que:-2 **(A)** Design a BCD synchronous counter using T flip flop. **[07]**
(B) Draw the logic diagram for 4 bit universal register. **[04]**

Que:-3 **Attempt All.** **[12]**

(A) Which flip flop has an ability to toggle or change the state? Explain it.
(B) Write down the excitation table for RS, JK, D and T flip flops.
(C) Explain the RTL gate.

Section - II

Que:-4 **Attempt All.** **[12]**

(A) Simplify following by K-Map:

$$F(W, X, Y, Z) = \sum (1, 3, 7, 11, 15)$$

$$D(W, X, Y, Z) = \sum (0, 2, 5)$$

(B) Explain full subtractor.
(C) Prove that $(B + BC)(B + B'C)(B + D) = B$.

OR

Que:-4 **Attempt All.** **[12]**

(A) Solve using K-map.

$$F(A,B,C,D,E) = \sum (0,2,4,6,9,11,13,15,17,21,25,27,29,31)$$

(B) Implement the following function with a multiplexer.
$F = A \oplus B \oplus C$.
(C) Show that $AB + (A + B)' = A \odot B$ by truth table.

Que:-5 **(A)** Solve by tabulation method. **[06]**

$$F(A, B, C, D) = \sum (0, 1, 6, 7, 8, 9, 13, 14, 15).$$

(B) Design and implement a 4 bit binary to gray converter. **[05]**

OR

Que:-5 **(A)** Design a logic circuit for the following function using tabular method. **[07]**

$$F(A, B, C, D) = \sum m(0, 1, 4, 7, 13, 14) + d(5, 8, 15)$$

(B) Design 4 X 16 decoder using two 3 X 8 decoder. **[04]**

Que:-6 **Attempt All.** **[12]**

(A) Multiply 1100_2 by 1001_2 using computer method.
(B) Compare digital system V/S analog system.
(C) Explain the equivalence logic gate.
(D) Draw the logic diagram for AND, OR and NOT gate using NOR gate.

END OF PAPER