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SE-6801

B. E. III (Sem - V) (Ele.) Examination

April / May – 2011

Digital Circuits

Time : **3** Hours] [Total Marks : **100**

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ **B. E. 3 (Sem - 5)**

Name of the Subject :

☛ **Digital Circuits**

☛ Subject Code No. : **6 8 0 1** ☛ Section No. (1, 2,.....) : **1, 2**

Seat No. :

Student's Signature

(2) Attempt all questions.

(3) Assume suitable data wherever necessary.

(4) Figures to the right indicate full marks.

(5) Programmable calculators are not allowed.

SECTION - I

1 (a) Short questions :

(1) Convert following number system. **2**

(a) $(4021.5)_5 = (?)_{10}$

(b) $(B65F)_{16} = (?)_{10}$

(2) Perform the binary subtruction using 1's complement method 43-57 **2**

(3) Write gray code and excess-3 code of following : 110110 **2**

(4) Explain De-Morgan's theorems. **2**

(5) What are weighted and non-weighted codes ? Explain with an example. **2**

(b) Find the complement of the functions 4

$F_1 = x'yz' + x'y'z$ and $F_2 = x(y'z' + yz)$.

(c) Express the Boolean function F = A+B'C in sum of minterms. Also draw logic diagram. 6

2 (a) Simplify the following Boolean function. 8

(1) F = A'B'C' + B'CD' + A'BCD' + AB'C'

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

(b) Explain BCD to excess-3 code conversion with necessary diagram. 7

OR

2 (a) Simplify following Boolean function using tabulation method 8

F (w,x,y,z) = $\sum$ (1,4,6,7,8,9,10,11,15)

(b) Explain carry generator and checker. 7

3 (a) Explain BCD adder. 8

(b) Implement a full-adder circuit with a decoder and two or gates. 7

OR

3 (a) Implement function F (A,B,C,D) = $\sum$ (0,1,3,4,8,9,15) using multiplexer. 8

(b) Write short note on types of ROM 3. 7

SECTION - II

Instructions : (1) Figures to the right indicate full marks.
(2) Programmable calculators are not allowed.
(3) Justify your answer with proper explanation.
(4) Draw logic circuit for design problem.

4 (a) Attempt all : **10**

(1) Draw characterstic table and excitation table for JK flipflop.

(2) List applications of counter.

(3) Explain terms : Edge trigger flipflop

(4) Draw basic block diagram of master slave flipflop.

(5) Explain term : Asynchronous Input

(b) List types of shift register and explain any one of them. **10**

5 (a) Design a type T-counter that goes through states 0-3-5-6-0... 8

(b) Explain 4 bit Johnson counter in detail. 8

OR

(b) Explain 4 bit binary counter with parallel load. 8

6 Attempt any **two** : **14**

(a) Explain clocked 'D' flipflop with NAND gates.

(b) Convert D flipflop to J K flipflop.

(c) A combination circuit is defined as the function :

$$F_1(A,B,C) = \sum (3,5,6,7)$$
$$F_2(A,B,C) = \sum (0,2,4,7)$$

Implement the circuit with a PLA having 3 inputs, 4 product terms and 2 outputs.
