Code No.BTS028A

B.TECH DEGREE (F.T) III SEMESTER EXAMINATION IN INFORMATION TECHNOLOGY/COMPUTER SCIENCE AND ENGINEERING, JULY 1997

IT/CS 304 DIGITAL CIRCUITS AND LOGIC DESIGN

Time: 3 Hours Max.marks: 100

I a) Convert the following decimal numbers to binary and then to Octal and Hexa decimal. (6)
(i) 46 (ii) 327.89 (iii) 20.305

b) Explain the different types of error detecting and error correcting codes. (9)

OR

II a) Represent the following decimal numbers in 2's complement format. (4)
(i) +3 (ii) +25 (iii) -5 (iv) -11

b) Simplify from first principles the functions (6)

(i) $F = \overline{A}\overline{B}\overline{C}D + \overline{A}\overline{B}CD + \overline{A}BCD + \overline{A}B\overline{C}D + AB\overline{C}D + ABCD$

(ii) $F = \overline{A}B\overline{C} + \overline{A}B\overline{D} + CD$ (5)

III a) Implement the following switching function using NOR gates only. (7)

f (A, B, C, D) = $\sum m(4,5,7,12,14,15) + \phi\ (3,8,10)$

b) Draw the diagram for a full subtractor and explain its working. (8)

OR

IV a) Make a k map for the following function and realise it using NAND gates only. (7)

f (A, B, C, D) = $AB + A\overline{C} + C + AD + A\overline{B}C + ABC$

b) Design a BCD to excess 3 code convertor. (8)

V a) Explain the following terms as applied to a logic family. (6)
i) Speed - power product ii) Fan-out iii) Noise margin

b) Draw the circuit diagram of a basic 2-input NAND gate in TTL and explain its operation. (9)

OR

VI a) Discuss the problems encountered while a CMOS gate is used to drive N TTL gates and explain how interfacing can be done. (10)

b) Explain tristate logic and its applications. (5)

VII a) Explain the difference between a sequential system and a combinational system, giving examples of each. (5)

b) Draw a logic diagram for a mod-8 Up Down counter and explain. (10)

(P.T.O)

OR

VIII a) Explain how T and D flip-flops are constructed using J-K flip-flops. (5)

b) Design a counter which counts through the following sequence 2-3-4-5-6-7-2,..... (10)

IX a) Draw the circuit of a MOS dynamic RAM cell and explain its working. (5)

b) Design a 4 line to 1 line multiplexer. (10)

OR

X a) What is meant by PLA? What are its advantages? How does it differ from a ROM. (5)

b) Implement the following multi-output combinational logic circuit using a 4 to 16 line decoder. (10)

$F_1 = \sum m\ (1,2,4,7,8,11,12,13)$, $F_2 = \sum m\ (2,3,9,11)$
$F_3 = \sum m\ (10,12,13,14)$ $F_4 = \sum m\ (2,4,8)$

XI Write short notes on any 5 of the following. (5 x5

1) LSI, MSI and VLSI chips
2) Johnson counter
3) Synchronous counter
4) EPROM
5) BCD codes
6) Triggering of flip-flops
7) Sequence generator
8) Master-slave J-K flip-flop.

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