M.Sc. Second Semester (Applied Electronics) (New) (CBS)

15018 : Digital Integrated Circuits

2 AE 3

P. Pages : 2

Time : Three Hours

AV - 3298

Max. Marks : 80

Notes : 1. Due credit will be given to neatness and adequate dimensions.
2. Assume suitable data wherever necessary.
3. Illustrate your answer necessary with the help of neat sketches.

1. a) Convert - **8**

i) $(A0F9.0EB)_{16}$ to decimal
ii) $(128)_{10}$ to binary
iii) $(463)_8$ to decimal
iv) $(1011011)_{gray}$ to binary

b) Perform 2's complement method for following. **2**

i) 11011 - 11001

c) prove : **4**

i) $AB + \bar{A}C + BC = AB + \bar{A}C$

ii) $A + B[AC + (B + \bar{C})D]$

OR

2. Obtain minimal expression using Quine McCluskey methods & realise using NAND gates only **14**

$f = \sum m(0, 1, 3, 4, 5, 7, 10, 13, 14, 15)$

3. a) Compare TTL, ECL, MOS & CMOS logic families. **6**

b) What is tristate logic ? Explain TSL inverter. **7**

OR

4. a) What is race around condition ? How is it overcome ? **7**

b) Design Modulo - 12 asynchronous binary ripple counter. **6**

5. a) Design a 40:1 multiplexer using 8:1 MUX. **7**

b) Design a 5-bit comparator using IC 7485. **6**

OR

6. a) Design 10-bit even parity generator using 74180. **7**

b) Explain decimal to BCD encoder IC 74147 & its working. **6**

7.	a)	Draw and explain block diagram of PLA.	**7**
	b)	Design a combinational circuit using ROM. The circuit accepts a 3-bit number and generates an output binary number equal to square of input number.	**7**

OR

8.	a)	Draw and explain FPGA architecture.	**7**
	b)	Explain carry look ahead adder.	**7**
9.	a)	Draw and explain 4-phase ratio less shift register.	**7**
	b)	Explain dynamic MOSRAM cell.	**6**

OR

10.	a)	Draw & explain BJT RAM cell.	**7**
	b)	Explain CCD memory operation.	**6**
11.		Design a sequence detector to detect 1010, if the input sequence is 01101010.	**13**

OR

12.	a)	State & explain general models of sequential machines.	**6**
	b)	A sequential circuit with two DFF A and B, two inputs x & y and one output Z is specified by following equation ?	**7**

$A_{n+1} = \bar{x}y + xA_n$

$B_{n+1} = \bar{x}B + xA$

$Z = B_n$

i) Draw state table

ii) Draw state diagram.

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