

Roll No. ....

## BCA-201(O)

### B. C. A. (Second Semester) EXAMINATION, May, 2012

(Old Course)

Paper First

#### DIGITAL PRINCIPLES AND APPLICATIONS

Time : Three Hours ]

[ Maximum Marks : 75

Section - A

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Note : Attempt all questions.

1. (a) Convert the following gray code to binary digits :

101101

(b) Multiply the following binary numbers :

11011  $\times$  1101

(c) Find the 9's complements of the number :

63,325,600

(d) Explain EBCDIC.

(e) What are the basic laws of Boolean algebra ?

(f) Draw logic diagrams for parity generator and parity checker.

P. T. O.

Note : Attempt any *seven* questions.

2. Express the following functions in a sum of minterms and a product of maxterms :

(a)  $F(x, y, z) = (xy + z)(y + xz)$

(b)  $F(A, B, C) = (A' + B)(B' + C)$

3. Draw the logic circuit for the Boolean equation :

(a)  $Y = A\bar{B}\bar{C}D + \bar{A}BCD + A\bar{B}C\bar{D} + ABC\bar{D}$

(b)  $F = (A + B)(B + C)(A + C)$

4. Simplify the Boolean function using the don't care conditions with K-map method :

(a)  $F(A, B, C, D) = \Sigma(4, 5, 6, 7, 12, 13, 14)$   
 $+ \Sigma d(1, 9, 11, 14)$

(b)  $F(w, x, y, z) = \Sigma(1, 3, 7, 11, 15) + \Sigma d(0, 2, 5)$

5. Draw block diagram of programmable logic array.

6. Implement a full-adder circuit with a decoder and two OR gates.

7. Draw and explain logic circuit of TTL.

8. (a) Explain the difference between serial and parallel adder.

(b) How parity generator works ?

9. Implement a full subtractor with decoder and NAND gates. The subtractor inputs are A, B and C. The subtractor produces outputs D and B.

10. Write the differences between the following :

(a) Decoders and encoders

(b) Multiplexers and demultiplexers.



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Section - C

15

Note : Attempt any *one* question.

1. (a) Using a decoder and external gates, design the combinational circuit defined by the following three

Boolean functions :

$$F_1 = \bar{x}\bar{y}\bar{z} + xz + yz;$$

$$F_2 = x\bar{y}\bar{z} + \bar{x}y ;$$

$$F_3 = \bar{x}\bar{y}z + xy ;$$

- (b) Design a 4 to 16 line decoder with five 2 to 4 line decoders with enable.

2. Write short notes on the following :

- (a) Universal gates
- (b) A/D techniques
- (c) Digital voltmeter
- (d) TTL clock
- (e) Memory addressing in RAM

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