2014

(1st Semester)

BACHELOR OF COMPUTER APPLICATION

Paper No. : BCA–104

(Revised)

(Digital Computer Fundamentals)

(PART : A—OBJECTIVE)

(*Marks* : 25)

The figures in the margin indicate full marks for the questions

SECTION—I

(*Marks* : 15)

I. Tick (✓) the correct answer in the brackets provided : 1×10=10

1. $(1)_{10} + (1)_{10}$ equals to

   (a) 2 ( )

   (b) 0 ( )

   (c) 1 ( )

   (d) 10 ( )

2. The 1's complement of $(1000)_2$ is

   (a) 0111 ( )

   (b) 0101 ( )

   (c) 1000 ( )

   (d) 0001 ( )

3.  is a symbol for

   (a) NAND gate ( )

   (b) NOR gate ( )

   (c) AND gate ( )

   (d) OR gate ( )

4. For a Boolean expression, $F = xyz$, the value of F will be 1, if

   (a) $x = 0, y = 0, z = 0$ ( )

   (b) $x = 0, y = 0, z = 1$ ( )

   (c) $x = 0, y = 1, z = 1$ ( )

   (d) $x = 1, y = 1, z = 1$ ( )

5. A combinational circuit that performs the addition of two bits is called

   (a) half adder ( )

   (b) full adder ( )

   (c) half subtractor ( )

   (d) full subtractor ( )

6. A digital function that produces the arithmetic sum of two binary numbers in parallel is

   (a) full adder ( )

   (b) binary parallel adder ( )

   (c) decimal adder ( )

   (d) BCD adder ( )

7. A register is a group of

   (a) OR gates ( )

   (b) OR and AND gates ( )

   (c) flip-flops ( )

   (d) None of the above ( )

8. A register that goes through a predetermined sequence of states is called

   (a) counter ( )

   (b) flip-flop ( )

   (c) RAM ( )

   (d) T-register ( )

9. MAR stands for

   (a) Main Architecture Register ( )

   (b) Multi Addition Register ( )

   (c) Memory Argument Register ( )

   (d) Memory Address Register ( )

10. The symbol R2 denotes

   (a) a register ( )

   (b) bit of a register ( )

   (c) transfer of information ( )

   (d) control function ( )

II. Tick (✓) whether the following statements are *True* (*T*) or *False* (*F*) : 1×5=5

1. Using 2's complement subtraction, $(1010100)_2 - (1000100)_2$ is 0010000.

(*T* / *F*)

2. A primed variable is not a literal.

(*T* / *F*)

3. Multiplexer means one-to-many.

(*T* / *F*)

4. A flip-flop circuit loses its state as soon as power is not delivered to the circuit.

(*T* / *F*)

5. A memory register of word is symbolized by the letter M.

(*T* / *F*)

SECTION—II

(*Marks* : 10)

III. Answer the following questions : 2×5=10

1. What is a register?

2. Write the gate symbol and truth table for Exclusive-OR (XOR) operation.

3. What is half subtractor?

4. What is a flip-flop?

5. What is an overflow?

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2014

(1st Semester)

BACHELOR OF COMPUTER APPLICATION

Paper No. : BCA-104

(Revised)

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Full Marks : 75

Time : 3 hours

(PART : B—DESCRIPTIVE)

(*Marks* : 50)

The figures in the margin indicate full marks for the questions

Answer the following questions : 10×5=50

1. *(a)* What are the error detection codes? Give example. 4

(b) Convert $(1000111101010000)_2$ to hexadecimal, octal and decimal numbers. 6

Or

(c) Define binary logic. Also explain the three basic operations of binary logic. 5

(d) Convert $(41)_{10}$ to binary, hexadecimal and octal numbers. 5

2. *(a)* Using Karnaugh's four-variable mapping, simplify the Boolean function

$$F = A'B'C' + B'CD' + A'BCD' + AB'C'$$ 6

(b) Write the gate implementation for the function $F = xy + x'y'$. 4

Or

(c) Express the Boolean function $F = xy + x'z$ in a product of maxterm form. 5

(d) Using Karnaugh's three-variable mapping, simplify the Boolean function

$$F = x'yz + x'yz' + xy'z' + xy'z$$ 5

3. *(a)* What is a decoder? Write and explain a 3-to-8 line decoder. 5

(b) Explain half adder by showing its truth table and implementation using logic gates. 5

Or

(c) What is a multiplexer? Write the logic diagram and block diagram of a 4-to-1 line multiplexer. 5

(d) Explain full adder by showing its truth table and implementation using logic gates. 5

4. *(a)* Explain the working of *D* flip-flop giving its logic diagram with NAND gates and its characteristic table. 5

(b) Describe how a shift register works by giving a detailed block diagram. 5

Or

(c) Explain the working *J-K* flip-flop giving its logic diagram and its characteristic table. 5

(d) What is a ripple counter? Explain how it works by giving a neat diagram. 5

5. *(a)* Explain different types of micro-operation encountered in digital systems. 5

(b) Differentiate between logic micro-operation and shift microoperation by giving a suitable example. 5

Or

(c) Explain the procedure for addition with sign 2's complement and sign 1's complement representation by giving a suitable example. 6

(d) Explain arithmetic shift operation with a suitable example. 4

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