GIET MAIN CAMPUS AUTONOMOUS,
GUNUPUR - 765022

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B.TECH. DEGREE EXAMINATION-Nov-Dec.2018
End Semester Examination-III Semester
BBSBS3030-DIGITAL LOGIC DESIGN
(Regulations 2017)(Common to CSE & IT Branches of Engineering)

Time : 3 Hours Maximum : 100 Marks Question Code:271412

Answer ALL Questions

PART-A (10 X 2=20 Marks)

1. (a) Give the decimal value of binary 10010. [CO1][PO2]
   A. 610 B. 910 C. 1810 D. 2010
   (b) Which of the following is the most widely used alphanumeric code for computer input and output? [CO1][PO1]
   A. Gray B. ASCII C. Parity D. EBCDIC
   (c) Which of the following expressions is in the sum-of-products (SOP) form? [CO2][PO1]
   a. (A + B)(C + D) b. (A)B(CD) c. AB(CD) d. AB + CD
   (d) What logic function is the sum output of a half-adder? [CO2][PO1]
   A. OR B. NOR C. exclusive-OR D. exclusive-NOR
   (e) A flip-flop has..... [CO3][PO1]
   A. one stable state B. no stable states C. two stable states D. none of the above
   (f) The terminal count of a modulus-11 binary counter is..... [CO3][PO1]
   A. 1010 B. 1000 C. 1001 D. 1100
   (g) Which of the following is a type of shift register counter? [CO3][PO1]
   A. Decade B. Binary C. Ring D. BCD
   (h) How many address bits are needed to select all memory locations in the 16K X 1 RAM? [CO4][PO2]
   A. 10 B. 12 C. 14 D. 18
   (i) A type of digital circuit technology that uses bipolar junction transistors is..... [CO4][PO1]
   A. TTL B. CMOS C. LSI D. NMOS
   (j) Which of the following is the fastest logic? [CO5][PO1]
   A. TTL B. ECL C. CMOS D. LSI

PART-B (10 X 2=20 Marks)

2.(a) Find the radix of the number system where 24 + 17 = 40. [CO1][PO2]
   (b) State De Morgan's law? [CO1][PO1]
   (c) Draw the truth tables of 3-input Universal Logic Gates. [CO1][PO1]
   (d) Implement the following Boolean expression with X-OR and AND gates. [CO2][PO3]
   F = AB'CD' + A'BCD' + AB'C'D + A'BC'D
   (e) Convert the following expression in canonical sum of products: [CO2][PO1]
   Y = AC + AB + BC
   (f) What is a shift register? Explain the principle of 4-bit parallel-in parallel-out shift register. [CO3][PO1]
   (g) If the initial counts of a Ring counter is 0110. What are the sequences of the counter? [CO3][PO1]
   (h) What is the difference between Mealy and Moore models? [CO3][PO1]
   (i) Explain how a single 2 x 4 decoder can be used to construct a 4 x 4 RAM. [CO4][PO3]
   (j) What is 'Fan in' and 'Fan out'of the integrated logic circuits? [CO5][PO1]

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PART-C (4 X 15=60 Marks)

3. (a) (i) Convert In a tabular form, write the ”2421”code and ”xcess-3”code of decimal digit ”0 to 9”.What are the special properties of these codes? [7][CO1][PO1]

(ii) Carry out the following additions : [8][CO1][PO2]

(i) (+13, -11) using 1’s complement notation. (ii)(-15, +9) using 2’s complement notation.

(or)

(b) (i) Convert the decimal number $4.532x10^7$ to a single-precision floating-point binary number. [7][CO1][PO2]

(ii) Establish the following identities of Boolean algebra [8][CO1][PO1]

(i) A + AB = A (ii)(A+ B)(A+ C) = A+ BC

4.(a) (i) Obtain the truth table of the following function (xy + z) (y + xz) and express in Sum-of-minterms and Product-of-maxterms. [7] [CO2][PO1]

(ii) Simplify the following function using Boolean algebra identity. [8][CO2][PO1]

F (A, B, C, D) = S m (4, 5, 6, 7, 12, 13, 14). And then, write the simplified functions in POS and SOP form.

(or)

(b) (i) Simplify the following Boolean function using a four variable K-map : [7][CO2][PO3]

F (A, B, C, D) = S m (0, 1, 3, 4, 5, 7, 9, 11, 15). And then, realize the simplified functions using logic gates.

(ii) Simplify F (A, B, C, D) = ABC + BCD + AD using K-map. [8][CO2][PO1]

5.(a)(i) What is race around conditions? How it is avoided [7][CO3][PO1]

(i) Using master slave Flipflop? (ii)Using edge triggering?

(ii) Write short notes on Master slave JK flipflop. [8][CO3][PO1]

(or)

(b)(i) Explain how a JK and SR flipflop can be constructed using D flipflop. [7][CO3][PO3]

(ii) Design a sequential circuit with two D flipflops A and B and one input X. When X = 0, the state of the circuit remains same. When X = 1, the circuit goes through the state transition from 00 to 01 to 11 to 10 d back to 00 and repeats. [8][CO3][PO3]

6.(a)(i) Describe the techniques used in Address Multiplexing in DRAM. [7][CO4][PO1]

(ii) How many 32K x 8 RAM chips are needed to provide a memory capacity of 256 K bytes? How many lines of the address must be used to access 256K bytes? How many of these lines are connected to the address inputs of all chips? [8][CO4][PO2]

(or)

(b) (i) Draw the diagram of the 4 x 4 RAM. [7][CO4][PO3]

(ii) A 3-input majority circuits produces the output as ’1’ when the number of 1’s are more than the number of 0’s at the input. Implement it using ROM. [8][CO4][PO3]

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