

KSIRHNA KANTA HANDIQUI STATE OPEN UNIVERSTIY
M Sc IT/MCA/PGDCA 1st Sem. Examination, 2014

Paper - 02
Digital Logic

Time : 3 Hrs.

Full Marks : 80

1. Answer any five from the following questions in brief 2×5 = 10
 - (a) Convert the decimal number 39.25 into its binary equivalent.
 - (b) What do you mean by 'Principle of duality'.
 - (c) Write the outputs of XOR gate and XNOR gate with two inputs.
 - (d) Draw the logic diagram and truth table of a half adder.
 - (e) What are flip flops. Give two examples.
 - (f) Write two applications of ROM.
 - (g) Write the truth table for a 3-input NOR gate.
2. Give answer any three from the following questions. 4×3 = 12
 - (a) Write and prove De Morgan's theorems.
 - (b) Add the following binary numbers :
 - (i) 11011011 and 10011101
 - (ii) 11111101 and 110011
 - (c) Realize NOT, AND, OR and NAND gater using NOR gate only.
 - (d) Draw a 3-to-8 line decoder with truth table.
 - (e) Distinguish between combinational circuit and sequential circuit. Give examples of each.
3. Write answer any three from the following questions. 6×3 = 18
 - (a) Perform the following operations :
 - (i) Convert the following binary numbers into its octal and hexadecimal equivalent.
101101001110 and 2
110110110·101
 - (ii) Convert 639_{10} to octal and hexadecimal equivalent. 2
 - (iii) Perform the multiplication of the following binary numbers : 2
 1101×111 and
 $1101 \cdot 1 \times 1101$
 - (b) Obtain the conomical sum of product of the following function : 3×2 = 6
 - (i) $Y(A,B,C) = \bar{A}B + B$
 - (ii) $Y(A,B,C) = A\bar{B} + B\bar{C} + C\bar{A}$
 - (iii) $Y(A,B,C,D) = A\bar{B}C + \bar{C}D$
 - (c) What are the different universal gater and why they called so? Describe all with logic symbol, boolean expression and truth tables.
 - (d) Explain with suitable logic diagrams and truth tables, the functions of a 2-bit comparator.
 - (e) Describe and distinguish between static RAM and dynamic RAM. Give examples of each.
4. Write any four answers of the following questions. 10×4 = 40
 - (a) (i) What are computer codes? Write about BCD code, ASCII code and EBCDIC code.
 - (ii) Express the function $F = A \cdot (A + \bar{B}) \cdot (B + \bar{C})$ into canomical POS form.
 - (iii) What is Karnaush map? Write the use of Karnaugh map. 3

- (b) Simplify the following boolean function using Karnaugh map. (any two)
- (i) $F(A,B,C,D) = \overline{A}BD + \overline{A}BC + \overline{A}B\overline{C} + AB\overline{D}$
- (ii) $F(A,B,C,D) = \overline{A}\overline{B}\overline{C}\overline{D} + \overline{A}\overline{B}C\overline{D} + \overline{A}B\overline{C}\overline{D} + \overline{A}B\overline{C}D + \overline{A}BCD + \overline{A}B\overline{C}D + ABC\overline{D}$
- (iii) $F(A,B,C,D) = \Sigma m(0, 1, 2, 4, 5, 6, 10, 14)$
- (c) What are shift registers? Describe briefly the different applications of shift registers. 2+8=10
- (d) (i) Describe and compare sequential access memory, random access memory and read only memory.
- (ii) Draw and label the logic diagram for a 256×4 static RAM. 4
- (e) (i) What are Master slave flipflops? 2
- (ii) Describe the functioning of a clocked Master slave JK flipflop with logic diagram, symbol and truth table. 8
- (f) Write short notes on the following : 5×2=10
- (i) Hamming coder
- (ii) Asynchronous and synchronous counters
- Or
- (i) Reduce the function given on $Z = f(A,B,C) = \overline{A}\overline{B}\overline{C} + \overline{A}B\overline{C} + A\overline{B}\overline{C} + A\overline{B}C$ using the tabulation method. 5
- (ii) Describe octal to binary encoder with logic diagram and truth tables. 5

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