

--	--	--	--	--	--	--	--	--	--



P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution under VTU, Belgaum)

First Semester, Master of Computer Applications (MCA)

Semester End Examination; Jan - 2017

Fundamentals of Computer Organization

Time: 3 hrs

Max. Marks: 100

Note : Answer FIVE full questions, selecting ONE full question from each unit.

UNIT - I

- 1 a. What are the basic laws of Boolean algebra? State each of them. 6
- b. Design and implement the following, 6
- i) NOR function using only NAND gate.
- ii) NAND function using only NOR gate.
- c. Distinguish between ; 8
- i) Sum of products and product of sums.
- ii) Max term and Min term
- 2 a. How sequential logic is different from combinational logic? Give example. 4
- b. Simplify: $f(A, B, C, D) = \Pi M(0, 3, 4, 7, 8, 10, 12, 14) + d(2, 6)$ 6
- c. Define Duality principle: Explain Huntington's postulates. 10

UNIT - II

- 3 a. Find the simplest form in SOP by using K - MAP for the following function. 6
- $$f(A, B, C, D) = \sum(0, 1, 2, 3, 8, 10, 14)$$
- $$d(A, B, C, D) = \sum(5, 6, 11, 15)$$
- b. Implement the following using only NOR gate; 10
- i) $f(a, b, c, d) = \bar{a}d + a\bar{d}(b + \bar{c})$
- ii) $y = \bar{a}\bar{b}\bar{c} + a\bar{b}\bar{c} + \bar{a}bd$
- c. How Don't Care Conditions helps in K - Map Simplification? Explain with relevant example. 4
- 4 a. What is full subtractor? Write truth table for full subtractor and obtain logical expression for differences and borrow output. Implement the same using two half subtractor. 10
- b. Define Parallel Adder? Explain a 4 - bit parallel adder using full adder. 10

UNIT - III

- 5 a. With neat diagram explain Master -Slave flip flop and how it works. 8
- b. Implement 4-bit Johnson Counter using SR - flip flop. Explain how it works. 8
- c. What is T - flip flop? Explain how do you convert JK flip flop into T - flip flop. 4

- 6 a. How performance of computer is measured? Explain. 8
- b. Explain how an instruction is executed with relevant block diagram showing the interconnection between processor and memory. 12

UNIT - IV

- 7 a. Explain Basic Instruction Formats with an example each. 12
- b. What is an interrupt? Explain. 8
 - i) Interrupt I/O operations
 - ii) Enabling and Disabling interrupts.
- 8 a. What is bus arbitration? Explain two approaches for bus arbitration. 10
- b. Distinguish between Auto increment and Auto decrement addressing mode. 6
- c. Briefly explain any four assembler directives. 4

UNIT - V

- 9 a. List and explain different types of ROMs. 10
- b. What do you mean by Mapping? Explain the concept of direct mapping. 10
- 10 a. With block diagram, explain internal organization of bit cells in memory chip consisting of 16 words of 8 bit each. 8
- b. Write a note on following :
 - i) Virtual memory organization
 - ii) Memory interleaving technique 12
 - iii) Hit rate and miss penalty
 - iv) Magnetic hard disk.

* * *