



**First Semester MCA Degree Examination, December 2010**  
**Fundamentals of Computer Organization**

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions.**

- 1 a. Perform the following number conversions:
  - i)  $(CA2)_{16} = (?)_{10}$                       ii)  $(628)_8 = (?)_{10}$
  - iii)  $(1101)_2 = (?)_{10}$                       iv)  $(675)_{16} = (?)_2$
  - v)  $(10101010.101010)_2 = (?)_{16}$  (10 Marks)
- b. Realize XNOR using NAND gates only. (05 Marks)
- c. Simplify and implement with AND, OR and NOT gates :  $\overline{A}.B + A.\overline{B} + A.B = Y$ . (05 Marks)
- 2 a. State and explain DeMorgan's theorem and simplify,
  - i)  $\overline{(\overline{A + B + C})} = Y$                       ii)  $\overline{(\overline{A + B})(\overline{A + B})}$  (09 Marks)
- b. Reduce the following function using K-map technique:
 
$$Y = A.\overline{B}.\overline{C}.D + \overline{A}.B.\overline{C}.D + \overline{A}.\overline{B}CD + \overline{A}B\overline{C}D + \overline{A}BCD + A\overline{B}\overline{C}D$$
 (06 Marks)
- c. With a neat circuit, explain how you convert inverters to gates. (05 Marks)
- 3 a. Explain different functional units of a computer. Mention the function of the processor registers, i) PC    ii) MAR    iii) IR. (08 Marks)
- b. Explain how the performance of a computer can be measured. What are the measures to improve the performance of computer? (06 Marks)
- c. Explain : Byte addressability
  - Big endian assignment
  - Little endian assignment (06 Marks)
- 4 a. Explain with an example, the different addressing modes in machine instructions. (08 Marks)
- b. Write an assembly language program to find the largest of N numbers. (06 Marks)
- c. What is a subroutine? Explain one stack frame with an example. (06 Marks)
- 5 a. What is the necessity of DMA controller? Explain the methods of bus arbitration. (08 Marks)
- b. What is secondary storage? Explain semiconductor RAM memories. (06 Marks)
- c. What is an interrupt? Explain daisy chain of interrupt priority schemes. (06 Marks)
- 6 a. With the block diagram, explain the operation of a 16 megabit DRAM configured as 2M X 8. (08 Marks)
- b. Explain virtual memories. (06 Marks)
- c. Define hit ratio and miss penalty for cache access and calculate the average access time, given a hit ratio of 0.92, cache access time of 40 ns and main memory access time of 300 ns. (06 Marks)
- 7 a. Explain the design of fast adders and perform addition and subtraction of signed numbers (-4) and (+5). (10 Marks)
- b. Perform multiplication of (+13) and (-6), using multiplier bit pair recording technique. (05 Marks)
- c. Represent  $2.34 \times 10^3$  using single precision and double precision floating point number. (05 Marks)
- 8 Write short notes on:
  - a. Difference between RISC and CISC.
  - b. Multiprocessors and multi-computer.
  - c. Memory organization.
  - d. Buses. (20 Marks)

