 End Sem (I) – MCA (I)

2016

Time: 3 hours

Full Marks: 70

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Answer from **all** the Groups are directed.

Group – A

(**Compulsory)**

1. Each question below gives a multiple-choice of answer. Choose the most appropriate one and write in the answer sheet: 1x15=15
    a) All the arithmetic and logical operations are performed in the CPU in special storage area called:
        i. Programming
        ii. Register
        iii. Memory
        iv. All of these
    b) The hardware of the Von-Neumann machine consist of
        i. A CPU which includes as ALU and CU
        ii. A main memory system
        iii. An Input/output system
        iv. All of the above

c) The single chip processor is known as:
    i. Macro processor
    ii. Microprocessor
    iii. Multiprocessor
    iv. All of these
d) A register which contains the data to be written in the memory (for write operation) or it receives the data from the memory (for read operations):
    i. MBR
    ii. MAR
    iii. Extension registers
    iv. All of these
e) In general we can represent gates in three ways, these are:
    i. Graphical symbols
    ii. Algebraic notation
    iii. Truth table
    iv. All of these
f) A binary cell which can store a bit of information known as:
    i. Diode
    ii. Register
    iii. Capacitor
    iv. Flip-flop
g) A small fast memories placed between the processor and the main memory known as-
    i. Main Memory
    ii. Cache Memory
    iii. Interleaved Memory
    iv. All of these

h) A collection of all the instructions a CPU can execute:
    i. Instruction set
    ii. Conversion operation
    iii. Operand
    iv. All of these
i) The buses are classified into:
    i. Address bus
    ii. Data bus
    iii. Control bus
    iv. All of these
j) If you have more than one segment in the assembly language programs called:
    i. COM programs
    ii. EXE programs
    iii. Development programs
    iv. All of these
k) SIMD stands for:
    i. Single instruction multiple data
    ii. Single information multiple data
    iii. Single interrupts multiple data
    iv. All of these
l) A combinational circuit that performs the addition of two bits is called:
    i. Full adder
    ii. Half adder
    iii. Multiplexer
    iv. All of these
m) The 1's complement of 1010 is:

i. 0101
ii. 0011
iii. 1001
iv. All of these

n) A Microprocessor is a single chip CPU is: which there are mainly units:
   i. ALU
   ii. Register
   iii. Control unit
   iv. All of these

o) The 10's complement for the decimal number 256 is:
   i. 744
   ii. 745
   iii. 708
   iv. All of these

Group – B

Answer any **five** questions of the following: 4x5=20

2. What is micro-programmed control? Explain?
3. Discuss about Dynamic RAM and Access time on hard disks.
4. Explain Microprocessors (8085)
5. Construct the Karnaugh's Map for the function. F (a, b, c, d) = ∑ (0, 1, 2, 3, 4, 5, 9, 10). Find the optimal function in "product of sum" (POS) form.
6. Write short notes on the following:
   a) EPROM
   b) Multiplexers.

7. Draw the logic diagram of a binary cell of Random Access Memory using R-S flip-flop.
8. What are the differences between a microprocessor and micro-program? Is it possible to design a microprocessor without a micro-program?

Group – C

Answer any **five** questions of the following: 7x5=35

9. What is half adder? Draw the logic diagram for a half adder. How can you construct a full adder using two half adders and one logic gate? Draw the logic diagram for this construction.
10. What is an Input / Output processor? How is it different from Direct Memory Access? Discuss one architecture for connecting Input / Output modules.
11. Write short notes on the following:
    a) Boolean Expression
    b) Interrupts
    c) Asynchronous
    d) Demultiplexers
12. What is pipelining? What are the problems associated with pipelining? How can you tackle these problems?
13. Assume that you have a J-K flip-flop circuit and all gates with you. How will you convert this J-K flip-flop to behave like a D flip-flop? Use logic diagram for showing resulting construction.
14. An 8 bit register contains the value 10011000 initially. What will be the value of the register and carry flag if:

a) Arithmetic shift left is performed on it twice (also indicated overflow if any).
b) Circular shift performed four times.
c) The register is marked with a value 11110000 and the result is put back in the register.

15. Perform the arithmetic operations on the following by converting the decimal numbers to binary 2's complement notation using 8 bit registers. Also indicated the overflow or underflow if any:
    a) 29 + (-59)
    b) 100 + 28
    c) (-100) + (- 28)

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