

Department of Computer Science & Engineering
Motilal Nehru National Institute of Technology Allahabad, PRAYAGRAJ
 End Semester (Theory) Examination (ODD-Semester) 2018-19
 Class: MCA (First Semester) 2018-19

Subject: Digital Computer Organization (Code:CS-31103)

M.M. : 60

Time: 3 Hrs

Note: 1. Attempt any FIVE(05) questions including Q. No. (1) which is COMPULSORY to ALL.

2. All parts of a question should be answered in one attempt SEQUENTIALLY.

3. Write to the point, exactly what is asked.

4. Make & State necessary Assumptions clearly.

Q.No. 1 (COMPULSORY to ALL)

(A) Define the following terms in brief:

- (i) OS (ii) Assembler (iii) Loader (iv) Linker (v) Macro processor (vi) Microprocessor
 (vii) Address (viii) ASCII Code (ix) I/O Controller (x) BIOS Program (xi) Mother Board
 (xii) Universal Gates (xiii) VLSI (xiv) Cross Assembler

(B) Trace Flow Chart and then Write down a 8085 Assembly Language Program for sum of a series of Four 8-Bit Numbers stored from location 2501 H -2504 H. Sum is to be stored at Location 2450 H.

(C) A CPU needs 512 X 8 RAM & 512X8 ROM with the help of available 128X8 RAM & 512X8 ROM. Trace a neat diagram for the following:

(i) Block diagram of the RAM chip & ROM chip (ii) Relevant Memory Address Map for the CPU (iii) Memory connection to the CPU

(D) Explain in brief the construction & working of Hard Disk Drive . How exactly the DATA is stored and READ ? What is Access time, Seek Time & Latency Time?

(E) Write down “Bootting steps of an IBM PC” in Windows environment with Role of BIOS in the same. (07+03+(1+1+3)+3+2=20)

Q.No. 2 (A) Simplify the function $F(A,B,C,D)=\sum(0,1,2,5,8,9,10)$ using K-Map in SOP & POS forms.

(B) What is a Multiplexer? Trace Logic Diagram & Function Table for 4-to-1-Line Multiplexer.

(C) Define a “BUS”. Construct a BUS System using 4X1 MUX for 4 Registers, each with Size of 4 bits.

(D) Convert $(9AFC)_{16}$ to binary & find it's 2^s Complement. (03+03+03+01=10)

Q.No. 3 (A) Construct the following:

- (i) 4-bit Adder – Subtractor using Full Adder.
 (ii) 4-bit Binary Incrementer using Half Adder.

(B) A digital Computer has a Common BUS System for 16 Registers of 32 bits each. The BUS is constructed with Multiplexer. Answer the followings:

- (i) How many selection inputs are there in each Multiplexer?
 (ii) What size of Multiplexer are needed?
 (iii) How many multiplexers are there in the BUS.

(C) What is “Negative Logic”?

(03+03)+03+1=10

(....Continued on Page No. 02)

Q.No. 4 (A) Trace the BLOCK – DIAGRAM of INTEL 8085. Also mention details of SP, Instruction Register, & Temporary Register.

(B) Write down an Assembly Language program with proper comments for the followings:

(i) Write down the program for division of two 1-Byte numbers A & B ($A \div B : A > B$) as discussed in the Class.

(ii) Product of two 8-Bit Numbers; Product is 8-Bit.

(04+(03+03)=10)

Q.No. 5(A) What do you understand by “Addressing Modes”? Discuss various Addressing Modes of INTEL 8085 Microprocessor with Example.

(B) Trace a Logic for setting the bits of Status Register of a CPU.

(C) What is an Instruction Cycle? Explain properly.

(D) What is Interrupt & PSW? Differentiate: External Vs Internal Interrupt.

(03 + 02 + 02 + 03 = 10)

Q.No. 6(A) Define the Followings in reference to Control Memory:

(i) Control Word (ii) Microinstruction (iii) microprogram (iv) Control Memory (v) Control Address Register (vi) Sequencer (vii) Pipe line Register (viii) Hard wired Control

(B) Explain properly the Selection of Addresses for Control Memory.

(C) Is it possible to design a Microprocessor without a microprogram? Are all microprogrammed Computers also Microprocessors?

(04+04+02 = 10)

Q.No. 7(A) What is Associative Memory? Explain its organization using Block diagram. What is role of Argument, Key & Match Registers? Explain with a simple example.

(B) Explain in brief Match Logic for one word of Associative Memory with relevant associated derivations.

(C) How write operation is performed in Associative Memory?

(04+04+02=10)

Q.No. 8(A) What exactly we mean by “Mapping Process” in Cache Memory?

Explain any TWO of the following “Mapping Process” in brief:

(i) Associative Mapping (ii) Direct Mapping (iii) Set-Associative Mapping

(B) Explain in brief : “Writing into Cache”.

((03+03)+04=10)

Q.No. 9(A) What is Virtual Memory? Explain.

(B) Differentiate: Address Space Vs Memory Space.

(C) Explain in brief : Address Mapping using Pages

(03+03+04=10)

Q.No.10 Write Short Notes on any FIVE of the followings:

(A) Flip-Flops **(B)** Stack Organized CPU **(C)** Decoders **(D)** Counters

(E) PEN DRIVE: Construction & working **(F)** Page Replacement (2 X 5 = 10)

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