

**BACHELOR OF ENGINEERING (ELECTRICAL ENGINEERING)  
SECOND YEAR SECOND SEMESTER EXAM 2023**

**SEQUENTIAL SYSTEMS & MICROPROCESSOR**

**Time:** Three Hours

**Full Marks:** 100

( 50 marks for each part)

Use a separate Answer-Script for each Part

**PART-I.**

Answer *any three* questions from this part.

*Two* marks are reserved for neat and well organised answer

1. a) Enumerate relative advantages and disadvantages between a relay logic and programmable logic based system. 4
- b) A system is described by,  $Y=C.(A+B.(A+B))+B.(A+B)$  4+4+4
- i) Simplify the system using Boolean Algebra
- ii) Implement the original expression through ladder diagram.
- iii) Implement the simplified expression through digital circuit..

2.	a) Draw the basic block diagram of a Mealy machine and describe the functions of each block. Also explain the difference between Moore and Mealy Machine.	8
	b) Describe with suitable block diagram how a D-FF can be realized with the help of a state machine model. Also mention the type of the state machine equivalent to the D-FF.	8
3.	a) Describe with suitable circuit diagram the operation of a 4-bit Shift Left Register using D FF having parallel and serial loading capability.	8
	b) Enumerate the differences between the excitation table and truth table. With help of truth tables develop the excitation table of J-K and T FF.	8

[ Turn over

4.	a) Define Propagation delay time, Set-up time and Hold time in the context of flipflop operation.	8
	b) What is tri-stating logic? Define Read Cycle time, Write Cycle time and Access time with respect to the specification of a memory chip.	8
5.	a) Draw a Ladder diagram to implement through a PLC system the DOL starter of three phase induction motor. The starter is also fitted with STOP and OVERLOAD and over temperature protection. Draw power circuit diagram also and indicate inputs and outputs.	10
	b) What are field switches? Name four field switches that are used in PLC based system.	6

**B. E. (ELECTRICAL ENGINEERING) 2<sup>ND</sup> YEAR 2<sup>ND</sup> SEMESTER EXAMINATION, 2023**  
**Subject: SEQUENTIAL SYSTEMS & MICROPROCESSORS Time: 3 Hours Full Marks: 100**

**Part II (50 marks)**

Question No.	<b><u>Question 1 is compulsory</u></b> <b><u>Answer Any Two questions from the rest (2×20)</u></b>	Marks
Q1	Answer <i>any Two</i> of the following:	
(a)	What is a Microprocessor? Explain the difference between a Microprocessor and a Microcontroller.	5
(b)	Explain, with example, the difference between the machine level language and the assembly level language of the 8085 microprocessor.	5
(c)	Enlist the various types of Arithmetic and Logical operations of 8085 microprocessor.	5
(d)	What are Interrupts? Enlist the different interrupts associated with 8085 microprocessor according to their priority and state their functions.	5
Q2	(a) What are Program Counter and Stack Pointer? While executing a program, when the 8085 MPU completes the fetching of the machine code located at the memory address 2057H, what is the content of the program counter?	4+2
	(b) Define <i>bit</i> , <i>byte</i> , <i>word</i> , and <i>instruction</i> . What is the memory word size required in an 8085 system? If the memory chip size is 2048 x 8 bits, how many chips are required to make up 16K-byte memory?	2 +2 +2
	(c) Consider the following set of instructions: Block 1 :     MVI C, 45H             Load register C with 45H Block 2:     ADD C                 Add two bytes and save the sum in A Block 3:     OUT 04H             Display accumulator contents at port 04H Block 4:     HLT                 End	
	(i) Identify the 1-byte, 2-byte and 3-byte instructions.	4
	(ii) Indicate the class of operation for each Block of instructions.	4

- Q3 (a) What is a Bus? Specify the function of the Address Bus and the direction of the information flow on the Address Bus. 2  
 How many memory locations can be addressed by a microprocessor with 14 Address lines? +4  
+2

- (b) Consider the hex codes of the following instructions are stored in memory locations from 2000H to 2005H as shown below.

2000	06	MVI B, 76H	
2001	78		
2002	3E	MVI A, F2H	8
2003	F2		
2004	80	ADD B	
2005	76	HLT	

Briefly explain what happens when the processor executes these instructions.

- (c) How Does a Microprocessor differentiate between Data and Instruction Code? 4

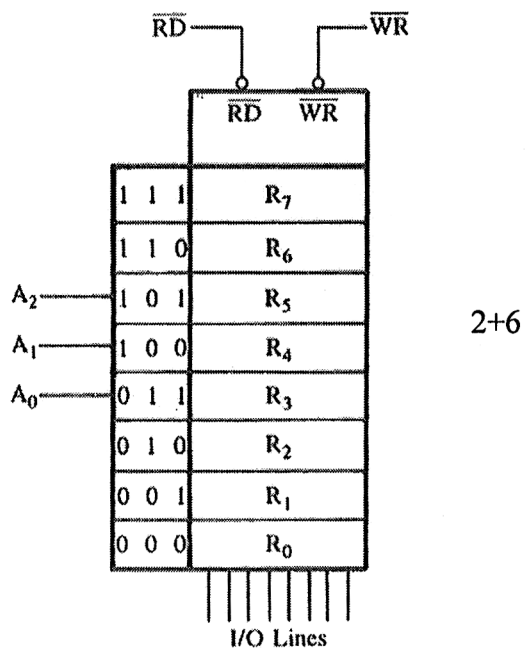
- Q4 (a) How the 8085 instruction set is classified based on the word size. Give an example for each such group. 6

- (b) What is Chip Select signal?

Suppose instead of a single chip with 8 registers (each being 8-bit), as shown in Figure Q4(b), you have 2 chips with 4 registers each (each being 8-bit).

You are required to access the 8 registers, as 4 registers each in 2 separate chips, using the same 3 address line A<sub>0</sub>, A<sub>1</sub> and A<sub>2</sub>.

Show how this problem of more than one chip can be solved in practice.



**Figure Q4(b)**

- (c) With the help of examples discuss about different types of Data Transfer operations that can be performed using 8085 microprocessor. 6

- Q5 (a) Briefly discuss the various types of Data Formats commonly used in 8085 microprocessor. 6
- (b) Illustrate the steps and draw the bus-timing diagram of data flow when the instruction code “0100 1111” (4FH for the operation **MOV C, A**), stored in location 2005H, is being fetched by the microprocessor. 8
- (c) What are the different Control and Status Signals associated with a Machine Cycle operation of 8085 microprocessor. 6