Printed Page:- 03 **Subject Code:- ACSIOT0302**

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: III - THEORY EXAMINATION (2023 - 2024)

Subject: Logic Design and Microcontroller

Time: 3 Hours **Max. Marks: 100**

General Instructions:

IMP: *Verify that you have received the question paper with the correct course, code, branch etc.*

1. *This Question paper comprises of* ***three Sections -A, B, & C.*** *It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.*

2. *Maximum marks for each question are indicated on right -hand side of each question.*

3. *Illustrate your answers with neat sketches wherever necessary.*

4. *Assume suitable data if necessary.*

5. *Preferably, write the answers in sequential order.*

6. *No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.*

SECTION-A 20

1. Attempt all parts:-

1-a. There are _____ cells in a 4-variable K-map. (CO1) 1

(a) 12

(b) 16

(c) 18

(d) 8

1-b. What is a multiplexer? (CO1) 1

(a) It is a type of decoder which decodes several inputs and gives one output

(b) A multiplexer is a device which converts many signals into one

(c) It takes one input and results into many output

(d) It is a type of encoder which decodes several inputs and gives one output

1-c. A basic S-R flip-flop can be constructed by cross-coupling of which basic logic gates? (CO2) 1

(a) AND or OR gates

(b) XOR or XNOR gates

(c) NOR or NAND gates

(d) AND or NOR gates

1-d. What is the difference between a shift-right register and a shift-left register? (CO2) 1

(a) There is no difference

(b) The direction of the shift
(c) Propagation delay
(d) The clock input

1-e. Which of the following is not correct about HLT instruction? (CO3) 1

(a) It is a machine control instruction
(b) It is used to start the execution of the program
(c) PC is disconnected from the address bus
(d) A reset interrupt is required to come out of halt state

1-f. Which of the following flag is used to mask INTR interrupt? (CO3) 1

(a) zero flag
(b) auxiliary carry flag flag
(c) interrupt flag
(d) sign flag

1-g. After RETI instruction is executed then the pointer will move to which location in the program? (CO4) 1

(a) Next interrupt of the interrupt vector table
(b) Immediate next instruction where interrupt is occurred
(c) Next instruction after the RETI in the memory
(d) None of the mentioned

1-h. Which of the following registers are not bit addressable? (CO4) 1

(a) SCON
(b) PCON
(c) A
(d) PSW

1-i. Vector address for Timer 1 Interrupt is ..... (CO5) 1

(a) 0003H
(b) 000BH
(c) 0013H
(d) 001BH

1-j. EA bit is used to_____. (CO5) 1

(a) enable or disable external interrupts
(b) enable or disable internal interrupts
(c) enable or disable all the interrupts
(d) none of the mentioned

2. Attempt all parts:-

2.a. What are the universal logic gates? (CO1) 2

2.b. State the difference between Synchronous and Asynchronous counters. (CO2) 2

2.c. What are the various registers in 8085? (CO3) 2

2.d.	Write a short note on Immediate addressing mode. (CO4)	2
2.e.	Explain different types of memory. (CO5)	2
SECTION-B		30
3. Answer any five of the following:-		
3-a.	Simplify: f(A,B,C,D)= ∑m(1,3,5,7,8,9,11,13,15) using POS form. (CO1)	6
3-b.	Design 1:16 demux using 1:4 demux. (CO1)	6
3-c.	Draw and explain the operation of T Flip-Flop. (CO2)	6
3-d.	What is ring counter? Explain 4-bit ring counter. (CO2)	6
3.e.	What is bus? Explain different types of buses. (CO3)	6
3.f.	Write a program to perform 8-bit addition and 8- bit subtraction in 8051. (CO4)	6
3.g.	Write down the programming steps for serial data transmission. (CO5)	6
SECTION-C		50
4. Answer any one of the following:-		
4-a.	F(A,B,C,D,E) = ∑m(4,5,7,8,10,14,27,31) + ∑d (0,1,2,11,19,25) minimize the given using K-MAP in SOP form. (CO1)	10
4-b.	Design a 4-bit parallel adder using gates. (CO1)	10
5. Answer any one of the following:-		
5-a.	Design a MOD4 down counter using T flip flop. (CO2)	10
5-b.	Realize SR flip flop using NOR gates and explain its operation. (CO2)	10
6. Answer any one of the following:-		
6-a.	Explain arithmetic and logical instruction of 8085 microprocessor in detail. (CO3)	10
6-b.	Draw and explain the timing diagram of opcode fetch cycle. (CO3)	10
7. Answer any one of the following:-		
7-a.	Explain the different addressing modes of 8051. Give an example for each one of them. (CO4)	10
7-b.	Explain the various instruction set of 8051. (CO4)	10
8. Answer any one of the following:-		
8-a.	Explain the LCD interfacing with 8051 microcontroller with suitable diagram. (CO5)	10
8-b.	Explain 8051 serial port programming with examples. (CO5)	10