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

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: III - CARRY OVER THEORY EXAMINATION - APRIL 2023

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. Which combinational circuit is renowned for selecting a single input from multiple inputs & directing the binary information to output line? (CO1) 1

(a) Data Selector

(b) Data distributor

(c) Both data selector and data distributor

(d) DeMultiplexer

1-b. A digital multiplexer is a combinational circuit that selects _____ . (CO1) 1

(a) One digital information from several sources and transmits the selected one

(b) Many digital information and convert them into one

(c) Many decimal inputs and transmits the selected information

(d) Many decimal outputs and accepts the selected information

1-c. A sequence of equally spaced timing pulses may be easily generated by which type of counter circuit? (CO2) 1

(a) Ring shift

(b) Clock

(c) Johnson

(d) Binary

1-d. The register is a type of _____. (CO2) 1

(a) Sequential circuit

(b) Combinational circuit

(c) CPU

(d) Latches

1-e. Which of the following is a 1-word instruction set? (CO3) 1

(a) LDA 2500H

(b) MOV A, B

(c) IN 01H

(d) MVI A,85H

1-f. Which is used to store critical pieces of data during subroutines and interrupts? (CO3) 1

(a) Stack

(b) Queue

(c) Accumulator

(d) Data register

1-g. _____ flag is used to detect error in signed arithmetic operation. (CO4) 1

(a) Carry

(b) Auxiliary Carry

(c) Overflow

(d) Parity

1-h. Which of the following instruction is used to jump from -128 to +128 bytes of the contents in PC? (CO4) 1

(a) ACALL

(b) LJMP

(c) LCALL

(d) SJMP

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

(a) 0003H

(b) 000BH

(c) 0013H

(d) 001BH

1-j. D flip flop divides the higher frequency by ____ if we connect its Q' to the D input. (CO5) 1

(a) 2

(b) 4

(c) 8

(d) 16

2. Attempt all parts:-

2.a. Explain why is a two-input NAND gate called universal gate? (CO1) 2

2.b. What is edge-triggered flip-flop? (CO2) 2

2.c. What is Program counter? (CO3) 2

2.d. Write a short note on register indirect addressing mode. (CO4) 2

2.e. State the difference between weighted and R-2R ladder DAC. (CO5) 2

SECTION B **30**

3. Answer any <u>five</u> 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. F(A,B,C,D) = ∑m(0,2,3,5,7,8,10,11,14,15) minimize the given using K-MAP in SOP form and implement this using gates. (CO1) 6

3-c. Explain briefly about serial in serial out shift registers with neat sketch. (CO2) 6

3-d. Explain JK Flip-flop in detail. What is the disadvantage of it and how it can be eliminated? (CO2) 6

3.e. List out the maskable and non maskable interrupts available in 8085. (CO3) 6

3.f. Explain the functions of the following pins of 8051. (CO4) 6

1. EA
2. ALE
3. RST

3.g. Explain different types of data transfer. (CO5) 6

SECTION C **50**

4. Answer any <u>one</u> of the following:-

4-a. Design 32:1 MUX using 2:1 MUX. (CO1) 10

4-b. What is carry look ahead adder? Explain with diagram. (CO1) 10

5. Answer any <u>one</u> of the following:-

5-a.	Design a 4-bit synchronous 8421 decade counter with ripple carry. (CO2)	10
5-b.	Design three bit synchronous counter with T flip flop and draw the diagram. (CO2)	10

6. Answer any <u>one</u> of the following:-

6-a.	Explain the 8085 microprocessor interrupt system in detail. (CO3)	10
6-b.	Explain the sequence of interrupt execution. (CO3)	10

7. Answer any <u>one</u> of the following:-

7-a.	Write and explain bit format for SCON and PCON SFR for 8051 Microcontroller. (CO4)	10
7-b.	Explain different Addressing Modes in 8051 microcontroller. (CO4)	10

8. Answer any <u>one</u> of the following:-

8-a.	How Liquid Crystal Display (LCD) is superior to conventional Display? List and describe the LCD Instructions. (CO5)	10
8-b.	Write an assembly language program for sending commands and data to LCD. (CO5)	10