Printed Page:- 04 **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 - AUGUST 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.*

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SECTION A **20**

1. Attempt all parts:-

1-a. Product-of-Sums expressions can be implemented using _____ . (CO1) 1

(a) 2-level OR-AND logic circuits

(b) 2-level NOR logic circuits

(c) 2-level XOR logic circuits

(d) Both 2-level OR-AND and NOR logic circuits

1-b. Each group of adjacent Minterms (group size in powers of twos) corresponds to a possible product term of the given _____ . (CO1) 1

(a) Function

(b) Value

(c) Set

(d) Word

1-c. D flip-flop is a circuit having _____. (CO2) 1

(a) 2 NAND gates

(b) 3 NAND gates

(c) 4 NAND gates

(d) 5 NAND gates

1-d. What type of register would have a complete binary number shifted in one bit at a time and have all the stored bits shifted out one at a time? (CO2) 1

(a) Parallel-in Parallel-out

(b) Parallel-in Serial-out

(c) Serial-in Serial-out

(d) Serial-in Parallel-out

1-e. SP stands for _____. (CO3) 1

(a) Stack pointer

(b) Segment pointer

(c) Status pointer

(d) State pointer

1-f. What is SIM? (CO3) 1

(a) Select interrupt mask

(b) Sorting interrupt mask

(c) Set interrupt mask

(d) None of these

1-g. Are PUSH and POP instructions are a type of CALL instructions? (CO4) 1

(a) Yes

(b) No

(c) None of the mentioned

(d) Can't be determined

1-h. Which of the ports act as the 16 bit address lines for transferring data through it? (CO4) 1

(a) PORT 0 and PORT 1

(b) PORT 1 and PORT 2

(c) PORT 0 and PORT 2

(d) PORT 1 and PORT 3

1-i. 8-bit ADC will have the step size of _____. (CO5) 1

(a) 19.53 mV

(b) 4.88 mV

(c) 1.2 mV

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(d) 0.076 mV

1-j. Which is true in interfacing 7 segment code display? (CO5) 1

(a) Transmitted by second port

(b) Display is selected by third port

(c) Display is selected by second port

(d) none of the mentioned

2. Attempt all parts:-

2.a. Simplify: f(A,B,C) = ∏M(1,2,4,6,7) using K Map in POS form. (CO1) 2

2.b. What do you mean by next state? (CO2) 2

2.c. Which interrupt is not level-sensitive in 8085? (CO3) 2

2.d. Write registers of 8051. (CO4) 2

2.e. Calculate the Iout for binary value 11110000 by assuming Iref=2mA. (CO5) 2

SECTION B **30**

3. Answer any <u>five</u> of the following:-

3-a. Simplify: f(A,B,C,D) = ∑m(1,2,4,6) and implement with logic gates. (CO1) 6

3-b. F(A,B,C,D) = ∑m(0,5,7,8,9.10,11,14,15) minimize the given using K-MAP in SOP form. (CO1) 6

3-c. Differentiate between latches & flip flops. (CO2) 6

3-d. Design MOD 3 UP/DOWN synchronous counter. (CO2) 6

3.e. List the major features of 8085 microprocessor. (CO3) 6

3.f. Explain briefly about IE and IP registers. (CO4) 6

3.g. Explain different modes of Timer for 8051 microcontroller.(CO5) 6

SECTION C **50**

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

4-a. Find expression for 7 segment LED. (CO1) 10

4-b. F(A,B,C,D) = ∑m(1,2,3,7,11,15) + ∑d (0,2,5) minimize the given using QM method. (CO1) 10

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

5-a. Design a synchronous 3-bit gray code up counter with the help of excitation table. (CO2) 10

5-b. i) What is clock? Describe different types of clock. (CO2) 10
ii) What is the purpose of clock signal?

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6. Answer any one of the following:-

6-a.	Explain the direct addressing modes and indirect addressing modes of 8085 with example. (CO3)	10
6-b.	Explain the functions of the ALE and IO/M' signals of the 8085 microprocessor. (CO3)	10

7. Answer any one of the following:-

7-a.	Mention the advantages of subroutines. Give the range of instructions SJMP, AJMP, LJMP in 8051. (CO4)	10
7-b.	List out the arithmetic operations of 8051 microcontroller with an example and show how the flags are affected for each operation. (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.	What is sensor? Explain various types of sensors. (CO5)	10

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