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NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B,Tech.

SEM: III - THEORY EXAMINATION (2022 - 2023)

Subject: Logic Design & 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. A code converter is a logic circuit that _____. (CO1) 1
- (a) Inverts the given input
 - (b) Converts into decimal number
 - (c) Converts to octal
 - (d) Converts data of one type into another type
- 1-b. Which is the major functioning responsibility of the multiplexing combinational circuit? (CO1) 1
- (a) Decoding the binary information
 - (b) Generation of all minterms in an output function with OR-gate
 - (c) Generation of selected path between multiple sources and a single destination
 - (d) Encoding of binary information
- 1-c. The truth table for an S-R flip-flop has how many VALID entries? (CO2) 1
- (a) 1
 - (b) 2

- (c) 3
- (d) 4
- 1-d. The logic circuits whose outputs at any instant of time depends only on the present input but also on the past outputs are called _____.(CO2) 1
- (a) Combinational circuits
- (b) Sequential circuits
- (c) Latches
- (d) Flip-flops
- 1-e. Which of the following is correct for microprocessor Intel 8085?(CO3) 1
- (a) 8 bit microprocessor
- (b) 16 bit microprocessor
- (c) 4 bit microprocessor
- (d) 32 bit microprocessor
- 1-f. When data required for instruction is present inside the register of a microprocessor then which of the following addressing mode is used? (CO3) 1
- (a) Indexed
- (b) Register
- (c) Relative
- (d) Direct
- 1-g. When carry is generated from D3 to D4 bit, which flag will get set? (CO4) 1
- (a) Auxiliary Carry
- (b) Parity
- (c) Carry
- (d) Overflow
- 1-h. When 8051 wakes up then 0x00 is loaded to which register? (CO4) 1
- (a) PSW
- (b) SP
- (c) PC
- (d) None of the mentioned
- 1-i. The hardware way of starting and stopping the timer by an external source is achieved by making _____ as set in the TMOD register. (CO5) 1
- (a) Gate

	(b) C/T	
	(c) M1	
	(d) M0	
1-j.	In reading the columns of a matrix, if no key is pressed we should get all in binary notation. (CO5)	1
	(a) 0	
	(b) 1	
	(c) Four bits	
	(d) 7	
2.	Attempt all parts:-	
2.a.	Implement 4:1 multiplexer using 2:1 multiplexer. (CO1)	2
2.b.	What is the operation of T flip-flop? (CO2)	2
2.c.	What are the hardware interrupts available in 8085? (CO3)	2
2.d.	Write a short note on Immediate addressing mode. (CO4)	2
2.e.	What are timer registers? (CO5)	2
	SECTION B	30
3.	Answer any <u>five</u> of the following:-	
3-a.	Design 1:16 demux using 1:4 demux. (CO1)	6
3-b.	$f(w,x,y,z) = \sum m(4,5,7,8,10,14)$ minimize the given using K-MAP in POS form. (CO1)	6
3-c.	Explain ripple counter. (CO2)	6
3-d.	What is need of shift register? Draw & explain bidirectional shift register. (CO2)	6
3.e.	Explain the function of following pins of microprocessor 8085. a) SOD/SID b) ALE c) HOLD (CO3)	6
3.f.	Write a program to perform 8-bit addition and 8- bit subtraction in 8051. (CO4)	6
3.g.	Explain TCON register of 8051 microcontroller with all bit representation. (CO5)	6
	SECTION C	50
4.	Answer any <u>one</u> of the following:-	
4-a.	Implement $F(A, B, C, D) = \sum(0,2,4,8,9,12)$ using 4x1 multiplexer. (CO1)	10
4-b.	Design excess 3 to binary code converter. (CO1)	10
5.	Answer any <u>one</u> of the following:-	
5-a.	Explain various steps in the analysis of synchronous sequential circuits with suitable	10

example. (CO2)

- 5-b. Explain T to D and D to T conversion. (CO2) 10
6. Answer any one of the following:-
- 6-a. Draw and explain the timing diagram of opcode fetch cycle. (CO3) 10
- 6-b. Specify the contents of the A,B,C,D,E,H,L ,M registers as each if the following instructions is being executed. (CO3) 10
- MVI C,FFH
LXI H,2030H
LXI D,7050H
MOV M,C
XCHG
LDAX D
HLT
7. Answer any one of the following:-
- 7-a. Explain the architecture of 8051 microcontroller with a neat block diagram. (CO4) 10
- 7-b. Write 8051 program to multiply two eight bit numbers 65H and 22H. (CO4) 10
8. Answer any one of the following:-
- 8-a. Discuss programming steps to generate time delay in 8051 and also write a program to generate delay of 10 second using timer 0 in mode 1. (CO5) 10
- 8-b. Interface 8051 to stepper motor and write an 8051 program to rotate the motor first +4 steps and then -6 steps. (CO5) 10