Printed Page:- 03

Subject Code:- BMICA0101

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

MCA (Integrated)

SEM: I - THEORY EXAMINATION (2023-2024)

Subject: Digital logic & Circuit Design

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. The radix of a Octal number is: (CO1) 1

(a) 2

(b) 10

(c) 8

(d) 16

1-b. The term in SOP are known as: (CO1) 1

(a) Maxterm

(b) Minterm

(c) Midterm

(d) Sumterm

1-c. Memory unit is not present in which type of circuit (CO2) 1

(a) Combinational circuit

(b) Sequential

(c) Both

(d) None

1-d. If the input is P and Q, the sum in half adder is: (CO2) 1

(a) $S=A \oplus B$

(b) $S=B \oplus A$

(c) $S=P \oplus Q$

(d) $S=P \oplus Q1$

1-e. Do a left shift of data X= 0100 by 1 bit (CO3) 1

(a) 1000

(b) 1010

(c) 1100

(d) 1001

1-f. If we connect a memory element with a combinational circuit to form a feedback path, it will act as: (CO3) 1

(a) Systematic circuit

(b) Silence circuit

(c) Sync circuit

(d) Sequential Circuit

1-g. The diagram that shows the transition of states is known as: (CO4) 1

(a) Transition diagram

(b) State Table

(c) Both of above

(d) None

1-h. A type of FSM where the outputs depend only on the current state (CO4) 1

(a) Deterministic FSM

(b) Mealy machine

(c) Moore machine

(d) Non- Deterministic

1-i. RFID stands for: (CO5) 1

(a) Radio Frequency Identification

(b) Radio Waves Frequency Identification

(c) Radio Frequency InterDependent

(d) Radio Wave Frequency Independent

1-j. M2M stands for: (CO5) 1

(a) Memory to machine

(b) Machine to Machine

(c) Machine to memory

(d) Many to machine

2. Attempt all parts:-

2.a. Convert the decimal number 24 into binary. (CO1) 2

2.b. Draw a neat and clean block diagram of Combinational circuit. (CO2) 2

2.c. Define register. (CO3) 2

2.d.	Give a brief introduction of Moore machine (CO4)	2
2.e.	Define actuator.(CO5)	2

SECTION-B 30

3. Answer any five of the following:-

3-a.	Brief Number System and its types (CO1)	6
3-b.	Perform the following conversion: (CO1) a) $(1101)_2 = (?)_{10}$ b) $(45.6)_{10} = (?)_2$	6
3-c.	Give a proper differentiation between encoder and decoder.(CO2)	6
3-d.	Construct a 4*1 MUX, draw its truth table, circuit diagram. (CO2)	6
3.e.	Differentiate between combinational circuit and sequential circuit. (CO3)	6
3.f.	Elaborate Hazards and its types. (CO4)	6
3.g.	Differentiate IOT and IIOT. (CO5)	6

SECTION-C 50

4. Answer any one of the following:-

4-a.	Explain the following terms with suitable example: a)Maxterm b)Minterm (CO1)	10
4-b.	Define Boolean algebra. Derive a boolean expression for F(A,B,C,D)= $\sum(0,1,2,3,6,8,9,10,11,13) + d(7,14)$ using k-map. (CO1)	10

5. Answer any one of the following:-

5-a.	Disuss the following combination circuits: a)Half Adder b)Full Adder,also draw the circuit diagram (CO2)	10
5-b.	Implement F (A, B, C, D) = $\sum (0,1,3,4,8,9,15)$ using 8x1 multiplexer: If MSB i.e. A is used as input variable and B, C, D as select lines. (CO2)	10

6. Answer any one of the following:-

6-a.	Construct SR Flip Flop By Using NAND Latch. Draw its truth table, characteristics table and equation and excitation table. (CO3)	10
6-b.	Explain the following: a) Ripple counter b) Ring counter (CO3)	10

7. Answer any one of the following:-

7-a.	Explain the following terms: a)Static-0 Hazard b)Static-1 Hazard c)Dynamic Hazard d)Melay machine e)Moore machine. (CO4)	10
7-b.	Explain Finite State Machine and its types. (CO4)	10

8. Answer any one of the following:-

8-a.	Elaborate sensor and its types. (CO5)	10
8-b.	Illustrate the working of Actuators with the help of an example. (CO5)	10