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NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

BCA

SEM: II - THEORY EXAMINATION (20..... - 20.....)

Subject: Digital logic & 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 term in SOP are known as: (CO1,K1)

1

- (a) Maxterm
- (b) Minterm
- (c) Midterm
- (d) Sumterm

1-b. In binary addition if we add $1+1$, so sum= (CO1,K1)

1

- (a) 0
- (b) 1
- (c) 01
- (d) 10

1-c. The combination of two half adders is a: (CO2,K1)

1

- (a) Delay
- (b) Half adder
- (c) Full Adder
- (d) Half subtractor

1-d. Is a combinational circuit that takes multiple input and gives only 1 output (CO2,K1)

1

- (a) MUX
- (b) DEMUX

- (c) Decoder
- (d) Encoder
- 1-e. The basic building block of a sequential circuit is: (CO3,K1) 1
- (a) Latch
- (b) Litch
- (c) Buffer
- (d) Flip-flop
- 1-f. If we have to make a MOD-6 counter then, the number of flip- flop required is: (CO3,K1) 1
- (a) 0
- (b) 1
- (c) 3
- (d) 5
- 1-g. A computation model that can be used to simulate sequential logic (CO4,K1) 1
- (a) Combinational circuit
- (b) Sequential circuit
- (c) Finite State Machine
- (d) Non finite machine
- 1-h. Requires less number of states: (CO4,K1) 1
- (a) Melay machine
- (b) Moore machine
- (c) Static
- (d) None
- 1-i. IIoT stands for: (CO5,K1) 1
- (a) Intense internet of things
- (b) Industrial Internet of Things
- (c) Incorporate internet of things
- (d) Index industry of things
- 1-j. The programming language is used by Arduino IDE IoT software for writing codes is: (CO5,K1) 1
- (a) Java
- (b) C/C++
- (c) Python
- (d) JavaScript

2. Attempt all parts:-

- 2.a. Convert the decimal number 24 into binary. (CO1,K1) 2
- 2.b. Draw a neat and clean block diagram of Combinational circuit. (CO2,K1) 2
- 2.c. Construct the excitation table for SR flip flop. (CO3,K1) 2

2.d.	Define state table. (CO4,K1)	2
2.e.	Mention the characteristics of IoT. (CO5,K1)	2
SECTION-B		30
3. Answer any <u>five</u> of the following:-		
3-a.	Perform 146+274 in BCD. (CO1,K2)	6
3-b.	Discuss weighted code with suitable examples. (CO1,K1)	6
3-c.	Explain full adder in detail. Also derive the boolean expression for sum and carry. (CO2,K1)	6
3-d.	Differentiate between MUX and DEMUX. (CO2,K1)	6
3.e.	Realize D flip flop using T flip flop. (CO3,K2)	6
3.f.	Explain Dynamic hazard with help of an example. (CO4,K1)	6
3.g.	Define smart objects and its characteristics. (CO5,K1)	6
SECTION-C		50
4. Answer any <u>one</u> of the following:-		
4-a.	Simplify the function using K-Map : $F(w,x,y,z) = \sum(0,1,2,3,7,8,10)$, $d(w,x,y,z) = \sum(5,6,11,15)$ (CO1,K2)	10
4-b.	Generate the hamming code for 1001 using even parity. (CO1,K2)	10
5. Answer any <u>one</u> of the following:-		
5-a.	Implement a full adder circuit using two 4:1 multiplexers. (CO2,K2)	10
5-b.	Design a combinational circuit which converts the BCD to Excess-3 code. (CO2,K2)	10
6. Answer any <u>one</u> of the following:-		
6-a.	Discuss shift registers, mention its types and also write the applications of shift registers. (CO3,K1)	10
6-b.	Design a 4 bit synchronous counter using D flip flop. (CO3,K2)	10
7. Answer any <u>one</u> of the following:-		
7-a.	Explain the following: a)State Diagram b)Transition matrix with the help of example. (CO4,K1)	10
7-b.	Construct a state and transition diagram for '101' sequence for melay machine. (CO4,K2)	10
8. Answer any <u>one</u> of the following:-		
8-a.	Draw a neat and clean diagram of Node MCU board, also explain its working. (CO5,K1)	10
8-b.	Explain how a Arduino interface with LED. (CO5,K1)	10