Printed Page:- Subject Code:- ACSIOT0302

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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 (2021 - 2022) (ONLINE)

Subject: Logic Design & Microcontroller

Time: 02:00 Hours Max. Marks: 100

General Instructions:

1. *All questions are compulsory. It comprises of two Sections A and B.*

- *Section A - Question No- 1 has 35 objective type questions carrying 2 marks each.*
- *Section B - Question No- 2 has 12 subjective type questions carrying 3 marks each. You have to attempt any 10 out of 12 question.*
- *No sheet should be left blank. Any written material after a Blank sheet will not be evaluated/checked.*

SECTION A 35 x 2 = 70

1. Attempt ALL parts:-

1.1.a The prime implicant which has at least one element that is not present in any other implicant is known as _____ 1

(a) Essential Prime Implicant

(b) Implicant

(c) Complement

(d) Prime Complement

1.1.b Product-of-Sums expressions can be implemented using _____ 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

1.1.c A Karnaugh map (K-map) is an abstract form of _____ diagram organized as a matrix of squares. (CO1) 1

(a) Venn Diagram

(b) Cycle Diagram

(c) Triangular Diagram

(d) Block diagram

1.1.d If A and B are the inputs of a half adder, the sum is given by _____ 1

(a) A AND B

(b) A OR B

(c) A XOR B

(d) A EX-NOR B

1.1.e Let A and B is the input of a subtractor then the borrow will be _____ 1

(a) A AND B’

(b) A' AND B

(c) A OR B

(d) A AND B

1.1.f A code converter is a logic circuit that _____ 1

(a) Inverts the given input

(b) Converts into decimal number

(c) Converts data of one type into another type

(d) Converts to octal

1.1.g What is a multiplexer? 1

(a) It is a type of decoder which decodes several inputs and gives one output

(b) A multiplexer is a device which converts many signals into one

(c) It takes one input and results into many output

(d) It is a type of encoder which decodes several inputs and gives one output

1.2.a The logic circuits whose outputs at any instant of time depends only on the present input but also on the past outputs are called _____ 1

(a) Combinational circuits

(b) Sequential circuits

(c) Latches

(d) Flip-flops

1.2.b What is a trigger pulse? 1

(a) A pulse that starts a cycle of operation

(b) A pulse that reverses the cycle of operation

(c) A pulse that prevents a cycle of operation

(d) A pulse that enhances a cycle of operation

1.2.c The characteristic equation of S-R latch is _____ 1

(a) Q(n+1) = (S + Q(n))R’

(b) Q(n+1) = SR + Q(n)R

(c) Q(n+1) = S’R + Q(n)R

(d) Q(n+1) = S’R + Q'(n)R

1.2.d The characteristic of J-K flip-flop is similar to _____ 1

(a) S-R flip-flop

(b) D flip-flop

(c) T flip-flop

(d) Gated T flip-flop

1.2.e With regard to a D latch _____ 1

(a) The Q output follows the D input when EN is LOW

(b) The Q output is opposite the D input when EN is LOW

(c) The Q output follows the D input when EN is HIGH

(d) The Q output is HIGH regardless of EN’s input state

1.2.f A counter circuit is usually constructed of _____ 1

(a) A number of latches connected in cascade form

(b) A number of NAND gates connected in cascade form

(c) A number of flip-flops connected in cascade

(d) A number of NOR gates connected in cascade form

1.2.g The full form of SIPO is _____ 1

(a) Serial-in Parallel-out

(b) Parallel-in Serial-out

(c) Serial-in Serial-out

(d) Serial-In Peripheral-Out

1.3.a An 8-bit microprocessor can process _____ data at a time. 1

A.

B.

C.
D.

(a) 4-bit
(b) 8-bit
(c) 16-bit
(d) All of the above

1.3.b Which of the following part of the microprocessor is close related to register? 1

(a) Processor
(b) CPU
(c) ALU
(d) Memory

1.3.c Which of the following function relate to stack? 1

(a) Push and pop
(b) Call and return
(c) Both push pop and call return
(d) None of the mentioned

1.3.d What is the function of STC instruction? 1

(a) Store to C Register, the value of Accumulator
(b) Set Carry to 1
(c) Clear the Stack pointer

1.3.e After "XRA A" instruction is executed, what will be the status of Zero Flag? (CO3) 1

(a) 1
(b) 0
(c) No change

1.3.f What does the last instruction of each subroutine that transfer the control to the instruction in the calling program with temporary address storage , called as? 1

(a) jump to subroutine
(b) branch to subroutine
(c) return from subroutine
(d) call subroutine

1.3.g What is SIM? 1

(a) Select interrupt mask
(b) Sorting interrupt mask
(c) Set interrupt mask
(d) None of these

1.4.a _____ flag is used to detect error in signed arithmetic operation. 1

(a) Carry
(b) Auxiliary Carry
(c) Overflow
(d) Parity

1.4.b When carry is generated from D3 to D4, which flag will get set. 1

(a) Auxiliary Carry
(b) Parity
(c) Carry
(d) Overflow

1.4.c Which of the following instruction is used to call the subroutine within the range of 64KB in memory location? 1

(a) ACALL
(b) LCALL
(c) LJMP
(d) SJMP

1.4.d MOV @R1,A is an example for 1

(a) Direct addressing mode
(b) Immediate addressing mode
(c) Register addressing mode
(d) Register indirect addressing mode

1.4.e When an interrupt is enabled, then where does the pointer moves immediately after this interrupt has occurred? 1

(a) to the next instruction which is to be executed
(b) to the first instruction of ISR
(c) to a fixed location in memory called interrupt vector table
(d) to the end of the program

1.4.f After RETI instruction is executed then the pointer will move to which location in the program? (CO4) 1

(a) Next interrupt of the interrupt vector table
(b) Immediate next instruction where interrupt is occurred
(c) Next instruction after the RETI in the memory
(d) None of the mentioned

1.4.g Calculate the address line required to interface 4KB of external memory. 1

(a) 10
(b) 11
(c) 12
(d) 13

1.5.a Which mode of timer will act as Split timer? a)0 b)1 c)2 d)3 1

(a) 0
(b) 1
(c) 2
(d) 3

1.5.b The hardware way of starting and stopping the timer by an external source is achieved by making _____ as set in the TMOD register. 1

(a) Gate
(b) C/T
(c) M1
(d) M0

1.5.c Which pin is used to adjust the contrast in LCD? 1

(a) Vcc
(b) Vss
(c) Vee
(d) Vdd

1.5.d If RS=0, then which register in LCD will be selected? (CO5) 1

(a) Command
(b) Data
(c) Internal
(d) Initialization

1.5.e Which mode of timer will act as 16 bit timer? 1

(a) 0
(b) 1
(c) 2
(d) 3

1.5.f 8-bit ADC will have the step size of 1

(a) 19.53mV
(b) 4.88mV
(c) 1.2mV
(d) 0.076mV

1.5.g Which pin in ADC0804 is also known as ‘Start of Conversion’? 1

(a) CS
(b) WR
(c) RD
(d) INTR

SECTION B 10 X 3 = 30

2. Answer any TEN of the following:-

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

2.1.b Explain basic steps of QM method. 2

2.2.a What are the different types of flip-flop? 2

2.2.b Define race around condition. (CO2) 2

2.2.c State the difference between Synchronous and Asynchronous counters. 2

2.3.a Name 5 different addressing modes? 2

2.3.b Which type of cycle is used for fetch and execute instruction? 2

2.3.c Explain various unconditional call and return instructions. 2

2.4.a Name the five interrupt sources of 8051?. 2

2.4.b Explain the functions of the pin PSEN of 8051. 2

2.5.a Calculate the conversion time of ADC0804, if R=10K ohm and C=150pF. 2

2.5.b What are timer registers? 2