CS302 - Sample Paper

Digital Logic and Design (Virtual University of Pakistan)

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Sample Paper
FINALTERM EXAMINATION
Fall 2022
CS302 – Digital Logic Design

Time: 90 min
Marks: 60

Question No: 1 (Marks: 01) - Please choose the correct option

Rise and fall in temperature during 24 hours is an example of a?

A. Continuous Quantity
B. Digital Quantity
C. Discrete Quantity
D. Digital & Discrete both

Question No: 2 (Marks: 01) - Please choose the correct option

The Sum-of-Weights method can be used to convert a Binary number of any magnitude to its equivalent.

A. Hexadecimal representation
B. Octal representation
C. Decimal representation
D. Binary representation

Question No: 3 (Marks: 01) - Please choose the correct option

In Binary to Hexadecimal Conversion, the Binary string is divided into small groups of _____ starting from the least significant bit.

A. 1-bits
B. 2-bits
C. 3-bits
D. 4-bits

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Question No: 4 (Marks: 01) - Please choose the correct option

F in Hexadecimal is equivalent to _____ in binary.

A. 1111
B. 1011
C. 0011
D. 0000

Question No: 5 (Marks: 01) - Please choose the correct option

The Boolean expression of AND gate is _____

A. Y = A.B
B. Y = A+B
C. Y = A-B
D. Y = A/B

Question No: 6 (Marks: 01) - Please choose the correct option

The logic NOR function is the combination of two logic functions that are _____logics.

A. OR & NOT
B. AND & NOT
C. OR & AND
D. NOT & XOR

Question No: 7 (Marks: 01) - Please choose the correct option

The output of a NAND is _____ when all inputs to the NAND gate are 1s.

A. 1
B. 00
C. 10
D. 0

Question No: 8 (Marks: 01) - Please choose the correct option

Demorgan's First Theorem states that the complement of a _____ of variables is equal to the sum of the complements of the variables.

A. Sum
B. Subtraction
C. Product

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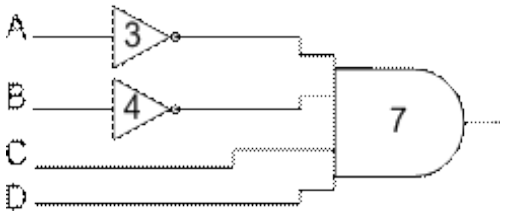
D. Division

Question No: 9 (Marks: 01) - Please choose the correct option



The simplified Boolean expression of this logic circuit is:

A. F = A.B.C.D
B. F = A+B+C+D
C. F = $\bar{A}.\bar{B}$.C.D
D. F = A.B.C+D

Question No: 10 (Marks: 01) - Please choose the correct option

A 4-variable K-Map has an array of _____ cells

A. 8
B. 16
C. 24
D. 32

Question No: 11 (Marks: 01) - Please choose the correct option

A K-map for _____ variables can be constructed by using two 4-variable K-maps.

A. 5
B. 8
C. 15
D. 30

Question No: 12 (Marks: 01) - Please choose the correct option

A standard way to express a Boolean expression is the _____ form.

A. POS
B. SOS
C. POP
D. SOP

Question No: 13 (Marks: 01) - Please choose the correct option

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XOR and _____ gates are used to implement the Odd-Parity Generator Circuit

A. OR
B. XNOR
C. NOR
D. NAND

Question No: 14 (Marks: 01) - Please choose the correct option

The 2's complement of any number is obtained by taking the 1's complement of a number and then _____ a 1 to the 1's complement.

A. Adding
B. Subtracting
C. Multiplying
D. Dividing

Question No: 15 (Marks: 01) - Please choose the correct option

The basic function of a Comparator is to _____ two binary quantities.

A. Multiply & Divide
B. Compare
C. Subtract
D. Add

Question No: 16 (Marks: 01) - Please choose the correct option

The Decimal-to-BCD Encoder has _____ inputs, for the decimal digits 0 to 9 and four outputs corresponding to the 4-bit BCD output.

A. Two
B. Eight
C. Ten
D. Sixteen

Question No: 17 (Marks: 01) - Please choose the correct option

Demultiplexer has a single input and _____ outputs.

A. Two
B. Three
C. Four

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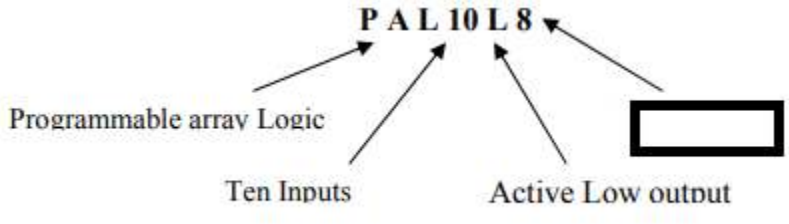
D. Several

Question No: 18 (Marks: 01) - Please choose the correct option



In this figure of Standard PAL Numbering, 8 at the last indicates

A. Eight Inputs
B. Eight Outputs
C. Eight bits
D. Eight Decimals

Question No: 19 (Marks: 01) - Please choose the correct option

ABEL Symbol for Logic operation OR is

A. !
B. &
C. #
D. $

Question No: 20 (Marks: 01) - Please choose the correct option

A.B in boolean notation is equivalent to _____ in ABEL notation.

A. !A
B. A&B
C. A#B
D. A$B

Question No: 21 (Marks: 01) - Please choose the correct option

Why latches are called memory devices?

A. It can store 8 bits of data
B. It has an internal memory of 4 bit
C. It can store one bit of data
D. It can store an infinite amount of data

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Question No: 22 (Marks: 01) - Please choose the correct option

Does the NAND latch work when both inputs are _____?

A. 1
B. 0
C. Inverted
D. Don't care

Question No: 23 (Marks: 01) - Please choose the correct option

The truth table for an S-R flip-flop has how many VALID entries?

A. 1
B. 2
C. 3
D. 4

Question No: 24 (Marks: 01) - Please choose the correct option

Does the basic latch consist of _____?

A. Two inverters
B. Two comparators
C. Two amplifiers
D. Two adders

Question No: 25 (Marks: 01) - Please choose the correct option

In D flip-flop, D stands for _____?

A. Distant
B. Data
C. Desired
D. Delay

Question No: 26 (Marks: 01) - Please choose the correct option

How many stable states do combinational circuits have?

A. 3
B. 4
C. 5
D. 2

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Question No: 27 (Marks: 01) - Please choose the correct option

In the serial shifting method, data shifting occurs _____?

A. One bit at a time
B. Two-bit at a time
C. Four bit at a time
D. simultaneously

Question No: 28 (Marks: 01) - Please choose the correct option

The full form of SIPO is _____?

A. Serial-in Parallel-out
B. Parallel-in Serial-out
C. Serial-in Serial-out
D. Serial-In Peripheral-Out

Question No: 29 (Marks: 01) - Please choose the correct option

The group of bits 10110111 is serially shifted (right-most bit first) into an 8-bit parallel output shift register with an initial state of 11110000. After two clock pulses, the register contains _____?

A. 10111000
B. 10110111
C. 11110000
D. 11111100

Question No: 30 (Marks: 01) - Please choose the correct option

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?

A. Parallel-in Parallel-out
B. Parallel-in Serial-out
C. Serial-in Serial-out
D. Serial-in Parallel-out

Question No: 31 (Marks: 01) - Please choose the correct option

What is the function of a buffer circuit?

A. To provide an output that is inverted from that of the input
B. To provide an output that is equal to its input
C. To clean up the input

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D. To clean up the output

Question No: 32 (Marks: 01) - Please choose the correct option

Which of the following has the lowest access time?

A. RAM
B. ROM
C. Flag
D. Registers

Question No: 33 (Marks: 01) - Please choose the correct option

Logic circuits can also be designed using _____?

A. RAM
B. ROM
C. PLA
D. PLD

Question No: 34 (Marks: 01) - Please choose the correct option

If enable input is high, then the multiplexer is _____?

A. Disable
B. Enable
C. High Impedance
D. Saturation

Question No: 35 (Marks: 01) - Please choose the correct option

A shift register is defined as _____?

A. The register is capable of shifting information either to the right or to the left
B. The register is capable of shifting information to another register
C. The register is capable of shifting information to the left only
D. The register is capable of shifting information to the right only

Question No: 36 (Marks: 01) - Please choose the correct option

Which circuit is generated from D flip-flop due to the addition of an inverter by causing the reduction in the number of inputs?

A. Gated D-latch
B. Gated T-latch
C. Gated JK-latch
D. Gated SR-latch

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Question No: 37 (Marks: 01) - Please choose the correct option

When a high is applied to the set line of an SR latch, then_____?

A. Q output goes high
B. Q output goes low
C. Q` output goes high
D. Both Q and Q` go high

Question No: 38 (Marks: 01) - Please choose the correct option

D flip-flop is a circuit having _____?

A. 5 NAND gates
B. 4 NAND gates
C. 3 NAND gates
D. 2 NAND gates

Question No: 39 (Marks: 01) - Please choose the correct option

What is a state diagram?

A. It provides the same information as the state table
B. It is similar to the characteristic equation
C. It provides a graphical representation of states
D. It is the same as the truth table

Question No: 40 (Marks: 01) - Please choose the correct option

How many different states do a 3-bit asynchronous down counter have?

A. 4
B. 6
C. 8
D. 2

Question No: 41 (Marks: 03)

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Convert the following hexadecimal number into an equivalent octal number. Also, write down all the steps.

$(A10)_{16}$

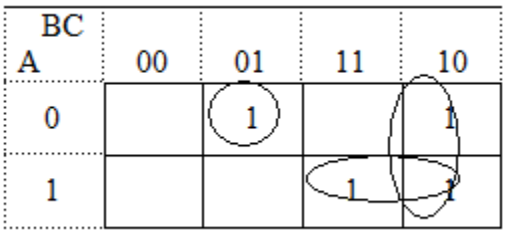
Question No: 42 (Marks: 03)

Convert the following binary number into an equivalent decimal number. Also, write down all the steps.

$(1111111)_2$

Question No: 43 (Marks: 03)

Write the simplified expression for the following table:



Question No: 44 (Marks: 03)

Consider a memory can store 32K nibbles then how many bytes a memory can store? Justify your answer with mathematical proof.

Question No: 45 (Marks: 03)

Apply the shift right operation on the given below 4-bit input and write the output. Consider the 3 clock pulses and write the steps for each pulse.

A = 1011

Question No: 46 (Marks: 03)

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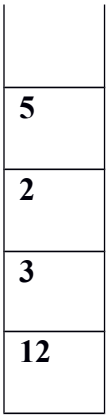
Consider the state of the stack given below:



Consider the following actions that have been executed and write the final state of the stack.

push 7

pop

pop

Question No: 47 (Marks: 05)

Make the function table for segment ‘d’ for the 7-segment display.

Question No: 48 (Marks: 05)

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Consider the 2 to 4 decoder and complete the following function table.

Input		Output			
I_1	I_0	O_0	O_1	O_2	O_3
0	0				
0	1				
1	0				
1	1				

Question No: 49 (Marks: 05)

Consider the following Boolean expression and write the equivalent ABEL expression.
F = AB'C + ABC + BD + CD + A'B'C'

Consider the Gated S-R Latch and complete the following table

Input			Output
EN	S	R	
0	x	x	
1	0	0	
1	0	1	
1	1	0	
1	1	1	

Question No: 50 (Marks: 05)

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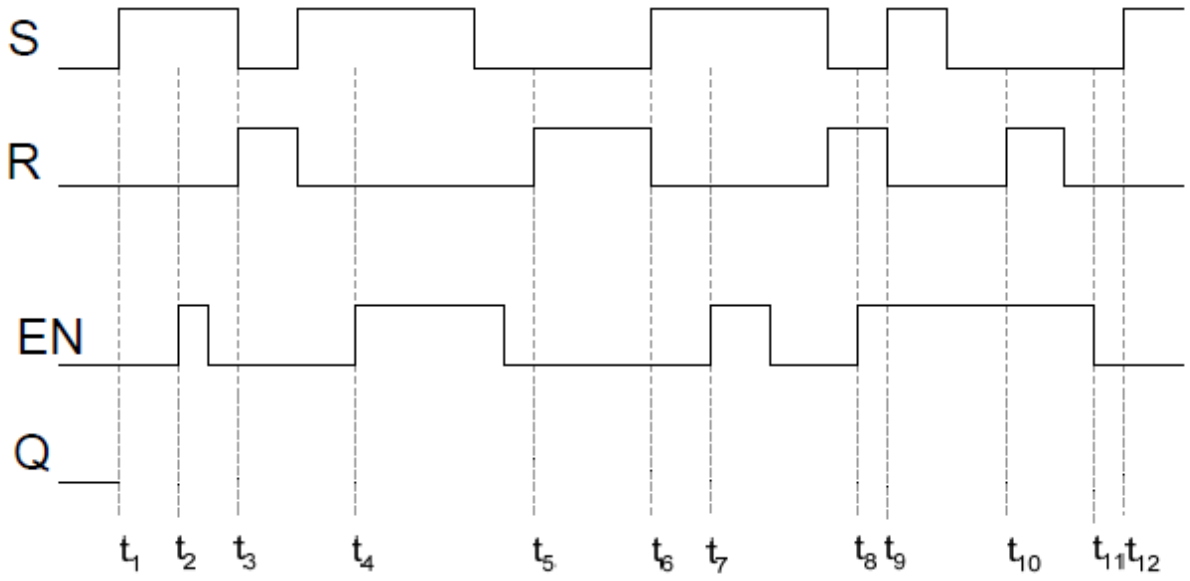
Consider the gated S-R latch and draw the output of the following timing diagram



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