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Digital Electronics frequently asked Interview Questions

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Digital Electronics most essential and frequently asked Interview Questions

Let me give a brief enlightenment on this particular domain i.e. **Digital Electronics.**

It is a very important and a common subject for electrical, electronics & Instrumentation Engineering student. It deals including the theory & practical knowledge of digital system and how they are performed in various digital instruments.

These questions have especially been designed for the Electronics Engineering Students, especially for those who are preparing for GATE, IES & other PSU exams?

A list of often asked Digital Electronics Interview Questions and answers are given below.

1) Differentiate between Latch and Flip-flop?

The difference between latches and Flip-flop is that the latches are level triggered and flip-flops are edge triggered. In latches level triggered applies that the output of the latches moves as we change the input and edge triggered means that control signal only changes its state when varies from low to high or high to low.

Latches are fast whereas flip-flop is slow.

 2) What is the binary number system?

A system which has a base 2 is known as the binary system and it consists of only two digits 0 and 1.

For Example: Take decimal number 625
625 = 600 + 20 + 5
That means,
6×100 + 2×10 + 5
6 ×102 + 2×101 + 5×100

In this, 625 consists of three bits, we begin writing the numbers from the rightmost bit power as 0 then the next bit as power 1 and the last as power 2. So, we can describe a decimal number as

∑digit × 10corresponding position or bit

is the total number of digits from 0 to 9.

3) State De Morgan's Theorem?

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De Morgan's Theorem stated two theorems:

1. The complement of a product of two numbers is the sum of the complements of those numbers.

(A. B)' = A' + B'

Truth Table:

2. The complement of the sum of two numbers is equal to the product of the complement of two numbers.

(A + B)' = A'B'

Truth Table:

4) Define Digital System?

Digital systems are the system that prepares a discrete or digital signal.

5) What is meant by a bit?

Bits represent the binary digits like 0 and 1.

6) Which is the best Example of Digital system?

Digital Computer.

7) How many kinds of number system are there?

There are four types of number system:

1. Decimal Number System.
2. Binary Number System.
3. Octal Number System.
4. Hexadecimal Number System.

8) What is the Logic gate?

The basic gates that build the digital system are called a logic gate. The circuit that can operate on many binary inputs to perform the particular logic function is called an electronic circuit.

9) What are the basic Logic gates?

There are three basic logic gates-

1. AND gate.
2. OR gate.
3. NOT gate

10) Which gates are called Universal gate and what are its advantages?

The Universal gates are NAND and NOR. The benefits of these gates are that they can be used for any logic calculation.

11) List some of the applications of the octal number system?

The applications of the octal number system are as given below:

1. For the efficient use of microprocessors.
2. For the efficient use of digital circuits.
3. It is used to enter binary data anddisplay of information.

12) What are the fundamental properties of Boolean algebra?

The basic properties of Boolean algebra are:

1. Commutative Property.
2. Associative Property.
3. Distributive Property.

13) What is Boolean algebra and Boolean expression?

Boolean algebra is an assortment of mathematics which deals with operations on logical values and incorporates binary variables. The differentiating factor of Boolean algebra is that it deals with the study of binary variables. Most usually Boolean variables are presented with the possible values of 1 ("true") or 0 ("false"). Variables can also have more complicated interpretations, such as in set theory. Boolean algebra is also known as binary algebra.
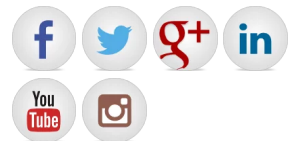
Whereas

In computer science, a Boolean expression is utilized as the expression in a programming language that gives a Boolean value when evaluated, that is one of true or false. A Boolean expression may be made of a mixture of the Boolean constants true or

false, Boolean-typed variables, Boolean-valued operators, and Boolean-valued functions.

Boolean expressions communicate to propositional formulas in logic and are a special case of Boolean circuits.

14) What is meant by K-Map or Karnaugh Map?

K-Map is a pictorial representation of the truth table in which the map is made up of cells, and each term in this represents the min term or max term of the function. By this process, we can quickly minimize the Boolean function without catching various steps.

15) Name the two forms of Boolean expression?

The two forms of Boolean expression are:

1. Sum ofproducts (SOP) form.
2. The Product ofsum (POS) form.

16) What are Minterm and Maxterm?

A Minterm is described as Product of sum because they are the logical AND of the set of variables and Maxterm is called the sum of product because they are the logical OR of the set of variables.

17) Write down the Characteristics of Digital ICs?

The characteristics of digital ICs are –

1. Propagation delay.
2. Power Dissipation.
3. Fan-in.
4. Fan-out.
5. Noise Margin.

18) What are the limitations of the Karnaugh Map?

The limitations of Karnaugh Map are as follows:

1. It is limited to six variable maps which means more than six variable involving expressions are not reduced.
2. These are useful for only simplifying Boolean expression which is represented Istandard form.

19) What are the advantages and disadvantages of the K-Map Method?

The advantages of the K-Map method are given below:

1. It is an excellent method for simplifying expression up to four variables.
2. For the logical simplification, it gives us a visual method.
3. It is suitable for both SOP and POS forms of reduction.
4. It is more suitable for classroom teachings on logic simplification.

The disadvantages of the K-Map method are given below:

1. It is not suitable when the number of variables exceeds more than four.
2. For Computer reduction, it is not suitable.
3. We have to take while entering the numbers in the cell-like 0, 1 and don't care terms.

20) What are the advantages of Quine-MC Cluskey method?

Advantages

1. It is systematic for producing a minimal function.
2. It is good at handling a large no ofvariables.

21) Define Pair, Quad, and Octet?

Pair: Two adjacent cells of karnaugh map are called as Pair. It cancels one variable in a K-Map simplification.

Quad: A Pair of Four adjacent pairs in a karnaugh map is known as a quad. It cancels two variables in a K-Map simplification.

Octet: A Pair of eight adjacent pair in a karnaugh map is called an octet. It cancels four variables in a K-map simplification.

22) Define Fan-in and Fan-out?

Fan-in- The Fan-in of the gate indicates that the number of inputs that are related to the gate without the degradation of the voltage level of the system.

Fan-out- The Fan-out is the maximum number of same inputs of the same IC family that a gate can drive maintaining its output within the specified limits.

ite the definition of the Duality Theorem?

Duality Theorem states that we can derive another Boolean expression with the existing Boolean expression by:

1. Changing OR operation (+ Sign) to AND operation (. Dot Sign) and vice versa.
2. Complimenting 0 and 1 in the expression by changing 0 to 1 and 1 to 0 respectively.

24) What is Half-Adder?

Half-adder is the circuits that implement the addition of two bits. It has got two inputs A and B and two outputs S (sum) and C (carry). It is drawn by XOR logic gate and an AND logic gate.

Truth Table of Half adder:

25) What is Full-Adder?

Full-adder is the circuits that implement the addition of three bits. It has got three inputs A, B and a carry bit. Full adders are outlined with AND, OR and XOR logic gate.

Truth Table of Full-Adder

26) What is power dissipation?

Period time is the electrical power used by the logic circuits. It is shown in milliwatts or nanowatts.

*Power dissipation = Supply voltage * mean current taken from the supply.*

27) What is a Multiplexer?

The multiplexer is a digital switch that combines all the digital erudition from several sources and gives one output.

28) What are the applications of Multiplexer (MUX)?

The applications of the multiplexer are as follows:

1. It is used as a data selector from many inputs to get one output.
2. It is used as A/D to D/A Converter.
3. These are used in the data acquisition system.
4. These are used intime multiplexing system.

29) What is Demultiplexer?

The demultiplexer is a circuit that takes the input on a single line and transmits this onto 2n possible output line. A Demultiplexer of 2n outputs has n select lines, which are utilized to select which output line is to be sent to the input. The demultiplexer is also called as Data Distributor.

30) What are the applications of Demultiplexer?

The applications of the demultiplexer are as follows:

1. It is used in the data transmission system with error detection.
2. It is used as a decoder for the conversion of binary to decimal.
3. It is also used as a serial to parallel converter.

31) Differentiate between Combinational Circuits and Sequential Circuits?

The differences between combinational and sequential circuits are given below:

S.No	Combinational Circuits	Sequential Circuits
1.	These are faster in speed.	These are slower.
2.	These are easy to design.	These are difficult to design.
3.	The clock input is not required.	The clock input is required.
4.	In this, the memory units are not required.	In this, the memory units are required to store the previous values of inputs.
5.	**Example:** Mux, Demux, encoder, decoder, adders, subtractors.	**Example:** Shift registers, counters.

32) Define Rise Time?

e can be termed as a time that is required to change the voltage level from 10% to 90%.

33) Define fall time?

Fall time can be defined as the time that is required to change the voltage level from 90% to 10%.

34) Define Setup time?

The minimum time that is needed to maintain the constant voltage levels at the excitation inputs of the flip-flop device before the triggering edge of the clock pulse for the levels to be dependably clocked in the flip flop is called the Setup time. It is denoted as tsetup.

35) Define Hold time?

The min. time at which the voltage level displays constant after triggering the clock pulse in order to reliably clock into the flip flop is called the Hold time. It is indicated by thold.

36) Differentiate between Synchronous and Asynchronous Counters?

The difference between Synchronous and Asynchronous Counters are as follows:

S.No	Asynchronous Counters	Synchronous Counters
1.	These are low-speed Counters.	These are high-speed Counters.
2.	The Flip flops of these boards are not clocked simultaneously.	In these counters, the flip-flops are clocked simultaneously.
3.	Simplistic logic circuits are there for more no. of states.	Complex logic circuits are there when the no. of states increases.

37) What are the applications of Flip-Flops?

The applications of flip-flops are:

1. Flip-flops are used as the delay element.
2. These are used for Data transfer.
3. Flip-flops are used in the Frequency Division and Counting.
4. Flip-Flops are used as the memory element.

38) Differentiate between D-latch and D Flip-flop?

D-latch is level sensitive vice-versa flip-flop is edge sensitive. Flip-flops are made up of latches.

39) What are the applications of Buffer?

Applications of the buffer are as follows:

1. Buffer helps to introduce small delays.
2. Buffer helps for high Fan-out.
3. Buffer are used to eliminate cross-talks.

We hope these questions and answers will help you in your Interviews.

Best of luck...

What is Iot and where it is used?

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