DLD viva preparatory questions

C O N T E N T S

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Revision 01

Digital Circuits Interview Questions and Answers

Q.1. What do you mean by word 'digital'?

Answer: Digital means sequence of numbers having finite precision.

Q.2. What is the difference between digital system and analog system?

Answer: A digital system is a combination of devices designed to manipulate logical information or physical quantities that are represented in digital form that is the quantities can take only discrete values.

Example of digital systems includes digital computers and calculators, digital audio and video equipments etc.

An analog system contains devices that manipulate physical quantities that are represented in analog forms. In an analog system, the quantities can vary over a continuous range of values.

Q.3. What is the difference between digital signal and binary signal?

Answer: A digital signal is defined as a signal which has only a finite number of distinct values. Digital signals are not continuous signal, they are discrete signals. If a digital signal has only two distinct values, i.e. 0 and 1 then it is called as a binary signal.

Q.4. What are the advantages of digital signal?

Answer: Advantages of digital signal are: Digital signals can be processed and transmitted more efficiently and reliably than analog signals. It is possible to store the digital data. Play back or further processing of the digital data is possible. The effect of noise (unwanted voltage fluctuations) is less. So digital data does not get corrupt.

Q.5. Define number system.

Answer: A number system defines a set of values used to represent quantity. Examples of number system are binary, octal, decimal, duodecimal, hexadecimal etc.

Q.6. How the resolution can be increased in floating point representation of numbers?
Answer: More the number of bits used in fraction part better will be the resolution.

Q.7. What is the size of bit, nibble, byte, word and double word in terms of number of bits?

Answer: Bit = 1 bits, Nibble = 4 bits, Byte = 8 bits, word = 16 bits, double word = 32 bits.

Q.8. Which code is called as minimum change code and why?

Answer: Gray code is called as minimum change code because it has a very special feature that only one bit will change, each time the decimal number is incremented.

Q.9. What is a INHIBIT gate?

Answer: It is basically an AND gate with one of its input negated by an inverter. In INHIBIT operation output is zero when blocking input is one.

Q.10. What is the advantage of fixed point representation compared to floating point representation?

Answer: Complexity and the cost of algorithm is less in fixed point representation, so it is suitable for time domain filtering.

Q.11. What is the advantage of floating point representation compared to fixed point representation?

Answer: Quantization error is small and dynamic range is high for floating point representation so it is suitable for frequency domain algorithm.

Q.12. What are ASCII codes?

Answer: ASCII is the abbreviation of American Standard Code for Information Interchange. It is a universally accepted alphanumeric code. It is used in most computers and other electronic equipment. Most computer keyboards are standardized with ASCII. When we press a key, the corresponding ASCII code is generated which goes in to the computer. ASCII has 128 characters and symbols. We need 7 bits to represent 128 characters. So ASCII is a 7 bit code.

Q.13. Which gate is known as coincidence detector?

Answer: XNOR gate is known as coincidence detector.

Q.14. Which gates are used in parity checking and parity generation of binary numbers?

Answer: XOR and XNOR gates.

Q.15. What are degenerated functions?

Answer: Degenerated functions are those which generate single operation.

Q.16. What do you mean by sampling jitter?

Answer: Sampling jitter is the error in placement of each block edge controlling the point when sampling begins.

Q.17. What do you mean by aperture jitter?

Answer: The RMS variation in time of the sampling instant caused by jitter in the sample-hold command signal is known as aperture jitter. It is associated with sample and hold circuit.

Q.18. What are universal gates?

Answer: Universal gates are those gates with the help of which any gates can be designed. NAND and NOR gates are universal gates.

Q.19. What is the difference between static logic circuits and dynamic logic circuits?

Answer: Static logic circuits perform the logical operations with voltage levels while dynamic logic circuits are based on the capacitive nature of input of MOSFET, working by transferring stored charges corresponding to logic levels from one circuit to another with the help of clock signals.

Q.20. Why look ahead carry adder is faster than ripple adder?

Answer: Look ahead carry adder is faster; since carry is generated in parallel at all the stages of addition rather than sequentially as in ripple adder.

Q.21. What will be the number of possible combinations with n variables?

Answer: The number of possible combinations with n variables is 2^n.

Q.22. What will be the number of possible Boolean function with n variables?

Answer: The number of possible Boolean function with n variables is 2^{2n}.

Q.23. What is the difference between compiler and interpreter?

Answer: Compiler- Programs that converts English like words of a high level language into the machine language of a computer. It needs a given program called source code and translates the program into the machine language, called object code.

Interpreter- It translates one statement at a time from a source code to an object code.

Q.24. What is the difference between simulator and emulator?

Answer: Simulator is just software which acts like hardware inside which we can see all electronic components and connect them in different manner to get the output while emulator is actual hardware.

Q.25. What is the difference between assembler and cross assembler?

Answer: Assembler- The program that translates an assembly language program from mnemonics to the binary machine code of the computer is called Assembler.

Cross Assembler- The program that translates the mnemonics of a particular microprocessor into the mnemonics of other microprocessor is called a Cross Assembler.

Q.26. How microprocessor works without internal memory?

Answer: Microprocessor consists of address, data and control buses with some internal registers to process the task through external memory.

Q.27. Define memory word.

Answer: Memory word is a group of bits in a memory that represents instructions of some type. For example, a register consisting of 8 flip flops can be used as a memory for storing an 8 bit word.

Q.28. What is direct memory access (DMA)?

Answer: DMA interface is used for transferring data directly between an external device and memory. The bus buffers in the microprocessor are disabled and go into a high impedance state during DMA transfer.

Q.29. What is PLD?

Answer: Programmable logic device (PLD) is an IC that contains a large number of interconnected logic functions. The user can program the IC for a specific function by selective breaking the appropriate interconnections.

Q.30. Define PAL and PLA.

Answer: Programmable array logic (PAL) –

- It is a class of programmable logic devices.
- Its AND array is programmable while its OR array is hard wired.

Programmable logic array (PLA) –

- It is a class of programmable logic devices.
- Both its AND and OR arrays are programmable.
- It is also called as field programmable logic array (FLPA).

Q.31. What are the requirements of a logic family?

Answer: The requirements of a logic family are-

- Propagation delay time is minimum.
- Losses should be minimum.
- It should be highly immune to noise.
- The size should be minimum.

Q.32. What are the characteristics of Resistor Transistor logic (RTL)?

Answer: The characteristics of Resistor Transistor logic (RTL)are-

- Very much compatible with other logic families.
- It is very economical. Its design is easy.
- It has poor noise immunity.
- Its speed is low.
- Power dissipation is low.
- It has low threshold and fan out is also less.

Q.33. What are the characteristics of Diode Transistor logic (DTL)?

Answer: The characteristics of Diode Transistor logic (DTL) are-

- In this transistor acts as inverting amplifier.
- It possesses high speed.
- It has low power dissipation.
- Logic is performed by diodes.
- Noise immunity and fan out is poor.

Q.34. What are the characteristics of Integrated Injection logic (IIL)?

Answer: The characteristics of Integrated Injection logic (IIL) are-

- Its power consumption is low.
- It has only one output per gate.
- It has good packing density.
- Speed is low.
- Noise margin is poor.
- One transistor is grown for each gate.

Q.35. What are the characteristics of Transistor Transistor logic (TTL)?

Answer: The characteristics of Transistor Transistor logic (TTL) are-

- It has good current capability.
- It is very economical.
- Its switching speed is good.
- It is compatible with DTL and CMOS.
- Schottky type has very high switching speed and low power consumption.

Q.36. What are the characteristics of Emitter Coupled logic (ECL)?

Answer: The characteristics of Emitter Coupled logic (ECL) are-

- It has low noise.
- It has got fastest speed among all logic devices.
- It needs good heat sinking.
- Its cost is high. Both normal and inverted outputs are obtained.
- Its power consumption is high.

Q.37. What are the characteristics of Metal Oxide Semiconductor logic (MOS)?

Answer: The characteristics of Metal Oxide Semiconductor logic (MOS) are-

- MOS family uses negative logic for its operation.
- It is very economical.
- It is easier to make large complex chips.
- It needs both positive and negative supplies.
- Its speed is very low.

Q.38. What are the characteristics of complementary metal oxide semiconductor (CMOS)?

Answer: The characteristics of complementary metal oxide semiconductor (CMOS) are-

- Noise margin is high.
- Its power dissipation is very low.
- Area used is more than MOS.
- Processing is very complicated.
- Its speed is very low.

Q.39. What do you mean by current hogging and which logic family has this problem?

Answer: Current hogging problem is due to different characteristics of transistor. Owing to these differences, the saturation voltages of the load transistors may be different. So when one transistor enters into saturation it will not allow other transistors to enter saturation and will take whole of the current supplied from the driver gate. This is known as current hogging. DCTL has the problem of current hogging.

Q.40. What is Fanout?

Answer: It is the maximum number of similar logic gate input that can be driven by a logic gate output without affecting the logic gate performance. High fanout is advantageous because it reduces the need for additional drivers to drive more gates.

Q.41. What are combinational circuits?

Answer: A combinational circuit is a logic circuit the output of which depends only on the combination of the inputs. The output does not depend on the past values of inputs or outputs. Hence combinational circuits do not require any memory.

Q.42. What is magnitude comparator?

Answer: A magnitude comparator is a combinational circuit that compares two numbers A and B and determines their relative magnitudes. The outcome of comparison is specified by three variables that indicates whether A>B, A<B or A=B.

Q.43. What is the range of temperature over which logic families works satisfactorily?

Answer:The temperature range is 0 to 70∘c.

Q.44. Which saturated logic family is suitable for large scale integration (LSI)?

Answer: Integrated Injection logic (IIL) is the only saturated bipolar logic suitable for large scale integration because of small silicon chip area required and low power consumption.

Q.45. What is the use of schottky TTL?

Answer: Schottky TTL removes the storage time of transistors by preventing them from going into saturation. This version increases the speed of operation without an excessive increase in power dissipation. This is the most popular version in new designs.

Q.46. What is the advantage of using open collector output in TTL logic gates rather than using totem pole output?

Answer: With Totem pole output wired-And operation is not possible in TTL gates which may lead to transistor burning. With open collector output wired-AND operation is possible.

Q.47. What are sequential circuits?

Answer: In the sequential circuit, the timing parameter comes into picture. The output of a sequential circuit depends on the present time inputs, the previous output and the sequence in which the inputs are applied. In order to provide the previous input or output, a memory element is required to be used. Thus a sequential circuit needs a memory element.

Q.48. How will you define the present state and next state of sequential circuit?

Answer: Present state- The data stored by the memory element at any given instant of time is called as the present state of the sequential circuit.

Next state- The combinational circuit operates on the external inputs and the present state to produce new outputs. Some of these new outputs are stored in the memory element and called as the next state of the sequential circuit.

Q.49. Define clock skew.

Answer: Clock skew is defined as the difference in time between the clock edges arriving at a pair of clock inputs.

Q.50. What is a flip flop?

Answer: Flip flop is also known as the basic digital memory circuit or in other words it is the basic memory element. It has two stable states namely logic 1 state and logic 0 state. It can store one bit of digital information therefore it is also called as 1-bit memory cell. We can design it by using NOR gates or NAND gates.

Logic Gates Questions and Answers

1. Explain what is a combinational circuit?

In a combinational circuit, the output depends upon present input(s) only i.e, not dependant on the previous input(s). The combinational circuit has no memory element. It consists of logic gates only.

2. Write two characteristics of combinational circuits.

The two characteristics of combinational circuits are:

In combinational circuits, the output exists as long as the input exists.

A combinational circuit will always respond in the same fashion to the input function, when we apply signal to the input terminal of the combinational logic circuit.

3. Explain what is a half-adder?

A logic circuit, that can add two 1-bit numbers and produce outputs for sum and carry, is called a half-adder.

4. Explain what is a full-adder?

A binary adder, which can add two 1-bit binary numbers along with a carry bit and produces outputs for sum and carry is called a full-adder.

5. Explain what is a flip-flop?

A flip-flop is a basic memory element that is made of an assembly of logic gates and is used to store 1-bit of information.

6. Explain what is a latch?

It is a D-type of flip-flop and stores one bit of data.

7. Explain what is an excitation table?

Excitation table gives an information about Explain what should be the flip-flop inputs if the outputs are specified before and after the clock pulses.

8. Explain what is a state table?

State table consists of complete information about present state, next state, and outputs of a sequential circuit.

9. Explain what is Boolean Algebra?

Boolean algebra is a mathematic system of logic in which truth functions are expresses as symbols and then these symbols are manipulated to arrive at conclusion.

10. Explain what are the basic logic elements?

Basic logic elements are NOT gate, AND gate, OR gate and the flip-flop.

11. Explain what is a truth table?

Truth table is a table that gives outputs for all possible combinations of inputs to a logic circuit.

12. Define positive logic and negative logic.

If the higher of the two voltages represents a 1 and the lower voltage represents a 0, then the logic is called a positive logic. On the other hand, if the lower voltage represents a 1 and the higher voltage a 0, we have a negative logic.

13. Explain what is pulse logic system?

A logic system in which a bit is recognized by the presence or absence of a pulse is called a pulse or dynamic logic system.

14. Explain what is an inverter?

An inverter is a logic gate whose output is the inverse or complement of its input.

15. Explain what are the universal logic gates?

Universal gate is a gate that can perform all the basic logical operations such as NAND and NOR gates.

16. Explain what is the specialty of NAND and NOR gates?

The specialty of NAND and NOR gates is that they are universal gates and can perform all the basic logical operations.

17. Explain why NAND-NAND realization is preferred over AND-OR realization?

NAND-NAND realization needs only one type of gate(NAND), that minimizes IC package counter.

18. Explain why is a two-input NAND gate called universal gate?

NAND gate is called universal gate because any digital system can be implemented with the NAND gate. Sequential and combinational circuits can be constructed with these gates because element circuits like flip-flop can be constructed from two NAND gates connected back-to-back. NAND gates are common in hardware because they are easily available in the ICs form. A NAND gate is in fact a NOT-AND gate. It can be obtained by connecting a NOT gate in the output of an AND gate.

19. Explain what is associate law?

Associate law is a low of addition and multiplication and according to this law grouping of the variable is the ORing or ANDing of several variables is immaterial and the results obtained are the same.

Digital Electronics Viva Questions and Answers

1. Define gates ?
Ans. Gates are the digital circuits, which perform a specific type of logical operation.
2 Define IC?
Ans. IC means integrated circuit. It is the integration of no. of components on a common substrate.
3. Define Universal gates.
Ans. Universal gates are those gates by using which we can design any type of logical expression.
4. Write the logical equation for AND gate.
Ans. Y=A.B
5. How many no. of input variables can a NOT Gate have?
Ans. One.
6. Under what conditions the output of a two input AND gate is one?
Ans. Both the inputs are one.
7. 1+0=?
Ans. 1
8. When will the output of a NAND Gate be 0?
Ans. When all the inputs are 1.
9. Define K-map ?
Ans. It is a method of simplifying Boolean Functions in a systematic mathematical way.
10. What are combinational circuits?
Ans. These are those circuits whose output depends upon the inputs present at that instant of time.
11. What are sequential circuits?
Ans. These are those circuits whose output depends upon the input present at that time as well as the
previous output.
12. If there are four variables how many cells the K-map will have?
Ans. 16.
13. When two min-terms can be adjacent?
Ans. 2 to the power n.
14. Which code is used for the identification of cells?
Ans8. Gray Code.
15. Define Byte?
Ans. Byte is a combination of 8 bits.
16. Flip flop is Astable or Bistable?
Ans. Bistable.
17. What are the I/Ps of JK flip–flop where this race round condition occurs?
Ans. Both the inputs are 1.
18. When RS flip-flop is said to be in a SET state?
Ans. When the output is 1.

19.When RS flip-flop is said to be in a RESET state?
Ans. When the output is 0.
20.What is the truth table of JK flip-flop?
21.What is the function of clock signal in flip-flop?
Ans. To get the output at known time.
22.What is the advantage of JK flip-flop over RS flip-flop?
Ans. In RS flip-flop when both the inputs are 1 output is undetermined.
23.In D flip-flop I/P = 0 what is O/P?
Ans.0
24.In D flip-flop I/P = 1 what is O/P?
Ans.1
25. In T flip-flop I/P = 1 what is O/P?
Ans. Qn
26. What do you understand by decoder?
Ans. A decoder is a combinational circuit that converts binary information from n input lines to a
maximum of 2n unique output lines. Most IC decoders include one or more enable inputs to control the
circuit operation.
27. What is demultiplexer?
Ans. The demultiplexer is the inverse of the multiplexer, in that it takes a single data input input and n
address inputs. It has 2n outputs. The address input determine which data output is going to have the
same value as the data input. The other data outputs will have the value 0.
28. What do you understand by encoder?
Ans. An encoder or multiplexer is therefore a digital IC that outputs a digital code based on which of its
several digital inputs is enabled.
29. What is the main difference between decoder and demultiplexer?
Ans. In decoder we have n input lines as in demultiplexer we have n select lines.
30. Why Binary is different from Gray code?
Ans. Gray code has a unique property that any two adjacent gray codes differ by only a sin-
gle bit.
31. Write down the method of Binary to Gray conversion.
Ans. Using the Ex-Or gates.
32. Write the full form of ASCII Codes?
Ans. American Standard Code for Information Interchange.
33.Binary code is a weighted code or not?
Ans. Yes
34 Why is MUX called as "Data Selector"?
Ans. This selects one out of many inputs.
35. What do you mean by Multiplexing?
Ans. Multiplexing means selecting only a single input out of many inputs.
36. What is Digital Multiplexer?
Ans. The multiplexer which acts on digital data.
37 What is the function of Enable input to any IC?
Ans. When this enable signal is activated.
38 What is demultiplexer?

Ans. A demultiplexer transmits the data from a single source to various sources.
39 Can a decoder function as a D'MUX?
Ans. Yes
40. What is the role of select lines in a Demultiplexer?
Ans. Select line selects the output line.
41. Differentiate between functions of MUX & D'MUX?
Ans. Multiplexer has only single output but demultiplexer has many outputs.
42.The number of control lines required for a 1:8 demultiplexer will be
Ans. 3
43. How many 4:1 multiplexers will be required to design 8:1 multiplexer?
Ans. 2
44. What do you understand by parallel adder?
Ans. If we place full adders in parallel, we can add two- or four-digit numbers or any other size desired
i.e. known as parallel adder.
45. What happens when an N-bit adder adds two numbers whose sum is greater than N or equal to 2
Ans. Overflow.
46. Is Excess-3 code is weighted code or not?
Ans. Excess-3 is not a weighted code.
47 What is IC no. of parallel adder?
Ans. IC 7483.
48. What is the difference between Excess-3 & Natural BCD code?
Ans. Natural BCD code is weighted code but Excess-3 code is not weighted code.
49. What is the Excess-3 code for (396) 10
Ans. (396) 10 = (011011001001) EX-3
50 Can we obtain 1's complement using parallel adder?
Ans. Yes
51 Can we obtain 2's complement using parallel adder?
Ans. Yes
52 How many bits can be added using IC7483 parallel adder?
Ans. 4 bits.
53 Can you obtain subtractor using parallel adder?
Ans. Yes
54 Give the basic rules for binary addition?
Ans. 0+0 = 0; 0+1 = 1; 1+1 = 1 0 ; 1+0 = 1.
55 Specify the no. of I/P and O/P of Half adder?
Ans2. Two inputs & one output.
56 What is the drawback of half adder?
Ans. We can't add carry bit from previous stage
57.Write the equation for sum & carry of half adder?
Ans. Sum = A XOR B; carry = A.B.
58 Write the equation for sum & carry of full adder?
Ans. SUM= A'B'C+A'BC'+AB'C'+ABC; CARRY=AB+BC+AC.
59.How many half adders will be required for Implementing full adder?
Ans. Two half adders and a OR gate.
60. Define Bit?
Ans. Bit is an abbreviation for binary digit.
61. What is the difference b/w half adder& half sub tractor?

Ans. Half adder can add two bits & half sub tractor can subtract two bits.

62. Half subtractor logic circuit has one extra logic element. Name the element?

Ans. Inverter.

63. Define Nibble?

Ans. Combination of four bits.

64 What is half subs tractor?

Ans. Performs subs traction of two bits.

65 For implementing half subs tractor how many EX-OR, AND gates and Not gates are required?

Ans. One EX-OR, one –AND gate, one- Not gate.

66. What are the logical equations for difference & borrow?

Ans. $D = \bar{A}B + A B$

$B = \bar{A}.B$

67. How full subtractor is different from half subs tractor.

Ans. Full sub tractor performs subtraction of three bits but half subs tractor Performs sub-traction of two

bits.

68. If inputs of half subs tractor are A=0, and B=1 then Borrow will be?

Ans. B=1

69. Is 2's complement method appropriate for subtraction?

Ans. 2's complement method is appropriate method for subtraction.

70. How many bits we use in half subtractor for subtraction?

Ans. only two bits.

71. Can we use parallel adder for subtraction?

Ans. We can use parallel adder using 2's complement method.

72. Which one is better subtractor or parallel adder for subtraction?

Ans. Parallel adder is the best option using 1's complement or 2's complement

73. Which adder is used for addition of BCD numbers?

Ans. BCD adder.

74.What is comparator?

Ans. Comparator compares the inputs (bits).

75. What are universal gates?

Ans. NAND, NOR

76. What is the full form of BCD?

Ans. Binary Coded decimal.

77. What is the base of binary number system? Ans. 2

78. How many bits are there in one byte?

Ans. 8

79. How many digits are there in octal number system?

Ans. 8

80. What is the binary no. equivalent to decimal no. 20?

Ans. 10100

81.A binary digit is called?

Ans. Bit.

81 Define Gates.

Ans. Gates are digital circuit, which perform a specific type of logical operation.

82 Define IC?

Ans. IC means Integrated Circuit It is the integration of no. of components on a common substrate.

83 (A+A), A=?

Ans. A.

84. Define universal gates

Ans. We can design any type of logical expression by using universal gates.

85 Will the output of a NAND Gate be 0.

Ans. When all the inputs are1.

86 Which IC is used for NAND GATE?

Ans. IC 7400.

87 Why NAND is called as universal gate?

Ans.Because all gates can be made using circuits.

88 Name any other universal gate?

Ans. NOR Gate.

89 Which type of TTL gates can drive CMOS Gate?

Ans. TTL with open collector can derive CMOS.

90 What is meant by literal?

Ans. A logical variable in a complemented or Un-complemented form is called a literal.