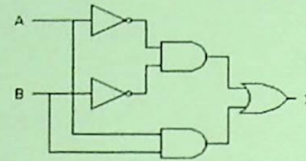




11. In a combinational circuit, the output at any time depends only on the \_\_\_\_\_ at that time.

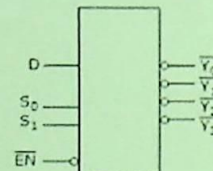
- a. Voltage
- b. Intermediate values
- c. Input values
- d. Clock pulses

12. What type of logic circuit is represented by the figure shown below?



- a. XOR
- b. XNOR
- c. AND
- d. XAND

13. The device shown here is most likely a \_\_\_\_\_



- a. Comparator
- b. Multiplexer
- c. Inverter
- d. Demultiplexer

14. The full form of SR is \_\_\_\_\_

- a. System rated
- b. Set reset
- c. Set ready
- d. Set Rated

15. How many types of flip-flops are there?

- a. 4
- b. 5
- c. 3
- d. 2

16. The time period of a monostable 555 multivibrator is

- a.  $T = 0.33RC$
- b.  $T = 1.1RC$
- c.  $T = 3RC$
- d.  $T = RC$

17. A monostable multivibrator has  $R = 120k\Omega$  and the time delay  $T = 1000ms$ , calculate the value of  $C$ ?

- a.  $0.9\mu F$
- b.  $1.32\mu F$
- c.  $7.5\mu F$
- d.  $2.49\mu F$

18. Free running frequency of Astable multivibrator?

- a.  $f = 1.44 / (R_A + 2R_B) C$
- b.  $f = 1.44 (R_A + 2R_B) C$
- c.  $f = 1.44 C / (R_A + 2R_B)$
- d.  $f = 1.44 R_A / (R_A + R_B)$

19. How many gates per chip are used in first generation Integrated Circuits?

- a. 3-30
- b. 30-300
- c. 300-3000
- d. More than 3000

20. Which of the following component cannot be fabricated in an IC?

- a. Resistor
- b. Transistor
- c. Capacitor
- d. Inductor

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**( Descriptive )**

Time : 2 hrs. 30 min.

Marks : 50

*[ Answer question no.1 & any four (4) from the rest ]*

1. a. Explain briefly the binary, decimal, octal and hexadecimal number systems with an example in each case. 4+4+2  
=10  
b. Determine the decimal numbers represented by the following binary numbers  
(i) 110101 (ii) 101101 (iii) 11111111 (iv) 0.10101  
c. Express the following decimal numbers in binary form  
(i) 25.5 (ii) 10.625
2. a. Explain the Double-Dadd method for converting a binary integer to decimal with a suitable example. 4+6=10  
b. What do you mean by Sign Magnitude representation of a binary number? What is the sign magnitude representation of the following binary numbers  
(i) 101100 (ii) 001000 (iii) 0111 (iv) 1111
3. a. Draw the circuit diagram of a transistor AND Gate and explain its operation (Use all the possible combinations of inputs to explain the operation). 5+5=10  
b. Simplify and show the gate implementation of the simplified expression for the following Boolean expression  
 $AB\bar{C} + A\bar{B}\bar{C} + \bar{A}BC + ABC + A\bar{B}C.$
4. a. With the help of a block diagram, explain the difference between a sequential and combinational circuit. 2+6+2  
=10  
b. What is the necessity of converting a gated SR latch to a gated D latch? Draw the logic diagram of a gated D latch and write the truth table, characteristics table and excitation table.  
c. Write the difference between latches and Flip-flops.

5. a. What is race around condition in JK Flip-Flop and how it can be eliminated? 4+6=10  
b. Draw the logic diagram and explain the operation of a Master-Slave JK Flip-Flop
6. a. Design a 3-line to 8-line decoder using AND gates. 5+5=10  
b. Implement 8×1 MUX using 4×1 MUX.
7. a. Draw the block diagram and explain the operation of an Astable multivibrator using IC-555 timer. 7+3=10  
b. Derive the expression for duty cycle and frequency of oscillation.
8. a. Classify the integrated circuit on the amount of circuitry or components used (Scale of Integration). 4+6=10  
b. Explain the different steps involve in the fabrication of a monolithic integrated circuit.

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