

QUESTION 2011

Group - A

(Multiple Choice Type Questions)

1. A. Choose the correct alternatives for the following:

i) $(A + A'B + B')$ is equal to

a) A

b) B'

☒ c) 1

d) 0

ii) (10110) is equivalent to

a) 20

☒ b) 22

c) 24

d) 18

iii) A BCD counter is an example of.

a) a decade counter

☒ c) both (a) and (b)

b) a full modules counter

d) none of these

iv) The output of a gate is LOW if and only if all its inputs are HIGH. It is true for

a) AND

☒ b) XNOR

c) NOR

d) NAND

v) De-Morgan's law states that

☒ a) $(A+B)' = A' \cdot B'$

b) $(A+B)' = A' + B'$

c) $(A \cdot B)' = A' \cdot B'$

d) both (a) and (c)

BCA DE-128

- vi) The complement of a variable is always
 a) 0
 c) equal to the variable
 b) 1
 ✓d) the inverse of the variable
- vii) 2's complement of '101011' is
 a) 010100
 b) 010011
 c) 101001
 ✓d) 010101
- viii) What is the ASCII code of 'A'?
 a) 98
 b) 0100
 c) 1100
 ✓d) none of these
- ix) 4-bit register can store
 a) a bit at a time
 ✓c) a nibble at a time
 b) a byte at a time
 d) none of these
- x) In toggle state of JK Flip-Flop
 a) present output is opposite of previous output
 ✓c) both (a) and (b)
 b) present output is same as previous output
 d) none of these
- xi) Full adder can add
 a) two binary numbers
 c) four binary numbers
 b) three binary numbers
 ✓d) none of these
- xii) MOD-10 counter can count upto
 a) 9
 ✓b) 10
 c) 8
 d) none of these

Group - B

(Short Answer Type Questions)

2. State and prove De-Morgan's theorems.

See Topic: BOOLEAN ALGEBRA, Long Answer Type Question No. 4.

3. Express the Boolean function $F = AB + AC$ in a product of maxterm form.

See Topic: BOOLEAN ALGEBRA, Short Answer Type Question No. 7.

4. Define multiplexer. Why is it called "Data Selector"?

See Topic: COMBINATIONAL CIRCUIT, Short Answer Type Question No. 1.

5. Use 4:1 MUX and other necessary logic gates to design a full adder.

See Topic: COMBINATIONAL CIRCUIT, Short Answer Type Question No. 6.

6. What is flip-flop? What is meant by race condition?

See Topic: FLIP-FLOP, Short Answer Type Question No. 5.

Group - C

(Long Answer Type Questions)

7. a) Using K-map method. Simplify the following Boolean function and obtain minimal SOP expression: $Y = \sum m(0, 2, 3, 6, 7) + \sum d(8, 10, 11, 15)$.

BCA DE-129

POPULAR PUBLICATIONS

b) Implement the Boolean Function:

$F = (A, B, C, D) = \sum m(0, 1, 3, 8, 9, 15)$ using two 4-to-1 multiplexer and one OR gate.

c) Design a gray code to binary converter circuit of 5 bits. What is nibble?

a) See Topic: KARNAUGH MAP, Long Answer Type Question No. 2.

b) See Topic: COMBINATIONAL CIRCUIT, Long Answer Type Question No. 11.

c) See Topic: COMBINATIONAL CIRCUIT, Long Answer Type Question No. 12.

8. a) Design a half adder circuit using minimum number of 2-input NOR gates only. Write Down the truth table and Boolean functions also.

b) Convert a D flip-flop to a J-K flip-flop. You can use additional circuiting if required.

c) What is full subtractor? Explain its basic structure with proper logic diagrams and truth tables.

a) See Topic: ARITHMETIC CIRCUIT, Long Answer Type Question No. 4.

b) See Topic: FLIP-FLOP Long Answer Type Question No. 12(b).

c) See Topic: ARITHMETIC CIRCUIT, Long Answer Type Question No. 3.

9. a) convert the following:

i) $(AC15)_{16} = (?)_{10}$

ii) $(1011001)_2 = (?)_{10}$

b) Discuss about the design of an odd parity generator.

c) Explain the concept of parity checking.

d) What is the advantage of J-K flip-flop over SR flip-flop.

a) See Topic: NUMBER SYSTEM, Long Answer Type Question No. 3.

b) & c) See Topic: COMBINATIONAL CIRCUIT, Long Answer Type Question No. 8.

d) See Topic: FLIP-FLOP, Short Answer Type Question No. 4.

10. a) What is the difference between sequential and combinational circuit ?

b) Describe the propagation delay of a flip-flop.

c) Express the Boolean function $F = AB + A'C$ in a product of maxterm form.

a) See Topic: COMBINATIONAL CIRCUIT, Short Answer Type Question No. 5.

b) See Topic: FLIP-FLOP, Long Answer Type Question No. 12(a).

c) See Topic: BOOLEAN ALGEBRA, Long Answer Type Question No. 8.

11. a) Draw a block diagram and write truth table of a D flip flop.

b) Compare asynchronous and synchronous counter.

c) Use 4 to 1 MUX and other necessary logic gate to design a full adder.

a) See Topic: FLIP-FLOP, Short Answer Type Question No. 3.

b) See Topic: RESISTER & COUNTER, Short Answer Type Question No. 1.

c) See Topic: COMBINATIONAL CIRCUIT, Short Answer Type Question No. 6.

12. Write the short notes on any three of the following:

a) EPROM

b) D flip-flop

c) Ripple counter

BCA DE-130

DIGITAL ELECTRONICS

d) Encoder

e) 4-bit parallel adder.

a) See Topic: **MEMORY DEVICE**, Long Answer Type Question No. 3(c).

b) See Topic: **FLIP-FLOP**, Long Answer Type Question No. 14(b).

c) See Topic: **RESISTER & COUNTER**, Long Answer Type Question No. 10(e).

d) See Topic: **COMBINATIONAL CIRCUIT**, Long Answer Type Question No. 14(g).

e) See Topic: **ARITHMETIC CIRCUIT**, Long Answer Type Question No. 5.