

QUESTION 2008

Group - A

(Multiple Choice Type Question)

1. Choose the correct alternatives for any ten of the following:

i) $(1100.1011)_2 = (?)_{10}$

a) 10.6785

b) 11.6578

✓ c) 12.6875

d) 13.6785 ✓

ii) 2's complement of 10101100 is

a) 11001010

b) 01010011

✓ c) 01010100

d) 01011001

iii) $(247.36)_8 = (?)_{16}$

✓ a) A7.78 ✓

b) 1A7.36

c) B7.87

d) 1B7.36

iv) MBR, in reference to memory management is

a) Memory Broad Register

b) Memory Buffer Relay

✓ c) Memory Buffer Register

d) None of these

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- v) Output of NAND gate is 1, if and only if
 a) all inputs are 1 b) any input is 1 c) all inputs are 0 ☒ d) any input is 0
- vi) $A + \bar{A} = ?$
☒ a) 1 b) 0 c) A d) $\bar{A}$
- vii) If the no. of states of a counter is 8, then the no. of flip-flops is
 a) 8 ☒ b) 3 c) 4 d) 6
- viii) $(A.B + \bar{A}.B + \bar{A}.\bar{B})$ is equal to
 a) $A + \bar{B}$ ☒ b) $\bar{A} + B$ c) $A + B$ d) 1
- ix) Karnaugh Map is used to
☒ a) simplify Boolean function b) design Boolean function
 c) evaluate Boolean function d) none of these
- x) A multiplexer has
 a) single input ☒ b) multiple input c) no output ☒ d) single output
- xi) Output of R-S (NAND) flip-flop, for $R = 1$ & $S = 1$ is
 a) set b) reset c) race ☒ d) no change
- xii) Subtracting 1111 from 11000 will result to
 a) 1000 b) 1100 ☒ c) 1001 d) 1011

Group - B

(Short Answer Type Questions)

2. Apply K-map to obtain the minimal form for the functions:

$$F(A, B, C, D) = \Sigma(0, 4, 5, 7, 8, 9, 13, 15)$$

$$d(A, B, C, D) = \Sigma(1, 2, 6, 10)$$

See Topic: KARNAUGH MAP, Short Answer Type Question No. 5.

3. Draw a half-adder circuit and describe its operations.

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

4. Design a 4-bit up-down counter.

See Topic: REGISTER & COUNTER, Long Answer Type Question No. 5.

5. Prove the following logical equation using Boolean algebra: $(A + BC) \cdot (B + \bar{A}C) = BC + \bar{A}C$

See Topic: BOOLEAN ALGEBRA, Short Answer Type Question No. 3.

6. i) Subtract $(7489)_{10} - (2485)_{10}$ using 10's complement method.

ii) What is a Multiplexer? Why is it called "Data selector"?

POPULAR PUBLICATIONS

- i) See Topic: **NUMBER SYSTEM**, Short Answer Type Question No. 7.
ii) See Topic: **COMBINATIONAL CIRCUIT**, Short Answer Type Question No. 1.

Group - C

(Long Answer Type Questions)

7. a) Represent the decimal number "27" in
i) BCD code ii) Octal code iii) Gray code
b) Draw the block diagram of a digital multiplexer and explain its function.
c) Give the functional truth table of a 4:1 multiplexer and realize it using basic gates AND, OR and NOT.
d) Implement the expression using a multiplexer:
$$f(A, B, C, D) = \sum m(0, 2, 3, 6, 8, 9, 12, 14)$$

a) See Topic: **NUMBER SYSTEM**, Short Answer Type Question No. 8.
b) & c) See Topic: **COMBINATIONAL CIRCUIT**, Long Answer Type Question No. 6.
d) See Topic: **COMBINATIONAL CIRCUIT**, Short Answer Type Question No. 2.

- B. a) What do you mean by a sequential circuit?
b) What are synchronous & asynchronous sequential circuits?
c) Explain the functionality of D-flip-flop. Give the truth table, state diagram.
d) What do you mean by Edge-triggering & Level-triggering in flip-flops?
See Topic: **FLIP-FLOP**, Long Answer Type Question No. 8.

9. a) What is flip-flop?
b) What are the uses of flip-flops?
c) Give the circuit diagram of a J-K flip-flop.
d) Give the truth tables of S-R & J-K flip-flops.
See Topic: **FLIP-FLOP**, Long Answer Type Question No. 9.

10. a) Given the following truth table:

Inputs			Outputs	
x	y	z	F1	F2
0	0	0	0	0
0	0	1	1	0
0	1	0	1	0
0	1	1	0	1
1	0	0	1	0
1	0	1	0	1
1	1	0	0	1
1	1	1	1	1

- i) Obtain the simplified functions in sum of products.
ii) Obtain the simplified functions in product of sums.
b) Design a BCD to Excess-3 Code converter.
a) See Topic: **BOOLEAN ALGEBRA**, Long Answer Type Question No. 7.
b) See Topic: **COMBINATIONAL CIRCUIT**, Long Answer Type Question No. 1.

DIGITAL ELECTRONICS

11. a) Explain different types of RAM and ROM.

See Topic: MEMORY DEVICE, Short Answer Type Question No. 1.

b) Write short notes on any two of the following:

- i) Parity checker
- ii) Ring counter
- iii) Magnitude comparator.

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

ii) See Topic: RESISTER & COUNTER, Long Answer Type Question No. 10(b).

iii) See Topic: COMBINATIONAL CIRCUIT, Long Answer Type Question No. 14(e).