

QUESTION 2012

Group - A

(Multiple Choice Type Question)

1. Choose the correct alternatives of the following:

i) The Boolean equation of AND operation is

- ✓a) $Y = \bar{A}$ b) $Y = AB$ c) $Y = A + B$ d) none of these

ii) The logical expression $Y = A + \bar{A}B$ is equivalent to

- a) $Y = AB$ b) $Y = \bar{A}B$ c) $Y = A + \bar{B}$ ✓d) $Y = A + B$

iii) The BCD equivalent of 57 is

- ✓a) 111001 b) 01010111 c) 101111 d) 10001010

iv) In the BCD code, the decimal number 123 is written as

- a) 11011 b) C3 c) 001010011 ✓d) 000100100011

v) A carry look-ahead adder is frequently used for addition, because it

- a) is faster b) is more accurate c) user fewer gates ✓d) costs less

vi) A combinational circuit is one in which the output depends on the

- ✓a) input combination at a time
b) previous output and input combination
c) previous input and input combination at a time
d) present output and previous output

vii) Each individual term in standard SOP form is called as

- ✓a) Maxterm b) Minterm c) Midterm d) none of these

viii) A decoder with 64 output lines has _____ data inputs.

- a) 64 b) 1 ✓c) 6 d) none of these

ix) The number of flip-flops required to build a Mod-15 counter is

- ✓a) 4 b) 5 c) 6 d) 7

- x) The full form of CCD is
- a) Charged-couple disk
 - c) Cache coupled device
 - ✓b) Charged-coupled device
 - d) none of these

Group – B

(Short Answer Type Questions)

2. Draw a full adder circuit as combination of 2 half adders.
See Topic: **ARITHMETIC CIRCUIT**, Short Answer Type Question No. 5.

3. State Demorgan's law and prove it for 2 variables.
See Topic: **BOOLEAN ALGEBRA**, Short Answer Type Question No. 8.

4. a) Evaluate $(7352)_{10} - (9456)_{10}$ using 9's complement.
b) State Duality principle.
a) See Topic: **NUMBER SYSTEM**, Short Answer Type Question No. 8.
b) See Topic: **BOOLEAN ALGEBRA**, Short Answer Type Question No 9.

5. Minimize the following Boolean expression using K-map.
 $F(A, B, C, D) = \sum (0, 1, 3, 6, 8, 10, 11, 13, 15)$.
See Topic: **KARNAUGH MAP**, Short Answer Type Question No. 9.

6. Design a 4 bit parallel-in parallel-out (PIPO) shift register.
See Topic: **RESISTER & COUNTER**, Short Answer Type Question No. 4.

Group – C

(Long Answer Type Questions)

7. a) Represent the decimal number 45 in
- i) Hexadecimal code
 - ii) Gray code
 - iii) BCD code
- b) Which gates are called universal gates and why?
- c) Design a 2×4 decoder. Give truth table and draw circuit diagram using basic gates.
- d) Implement the expression using a Multiplexer: $F(A, B, C, D) = \sum (0, 1, 4, 5, 7, 9, 11, 13, 15)$.
- a) See Topic: **CODES**, Long Answer Type Question No. 2.
b) See Topic: **LOGIC GATES**, Long Answer Type Question No. 2.
c) & d) See Topic: **COMBINATIONAL CIRCUIT**, Long Answer Type Question No 13.

8. a) What is combinational circuit?
- b) Differentiate between combinational and sequential circuit.
- c) Explain the functionality of clocked JK flip-flop. Give truth table and diagram.
- d) Convert SR to JK flip-flop.
- a) & b) See Topic: **COMBINATIONAL CIRCUIT**, Short Answer Type Question No 8(a) & (b).
c) & d) See Topic: **FLIP-FLOP**, Long Answer Type Question No. 13(a) & (b).

9. a) What is register?

b) Design a decimal to binary encoder.

c) What do you mean by Johnson counter?

a) See Topic: RESISTER & COUNTER, Long Answer Type Question No. 9(a).

b) See Topic: COMBINATIONAL CIRCUIT, Short Answer Type Question No. 7.

c) See Topic: RESISTER & COUNTER, Long Answer Type Question No. 9(b).

10. a) Given the following truth table.

X	Y	Z	F
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	0

Obtain the SOP and POS form and draw the circuit diagram.

b) Express the following Boolean expressions:

i) $f = AB + A'C$ in POS form

ii) $f = (A + BC)(B + C'A)$ in SOP form.

See Topic: KARNAUGH MAP, Long Answer Type Question No. 3.

11. a) What is the difference between synchronous and asynchronous counter?

b) Write short notes on the following:

i) EPROM

ii) DRAM.

c) What is the difference between SRAM and DRAM?

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

b) i) & ii) See Topic: MEMORY DEVICE Long Answer Type Question No. 3(b) & (c).

c) See Topic: MEMORY DEVICE Long Answer Type Question No. 2.