3.Convert binary 111111110010 to hexadecimal.

$EE2_{16}$

$FF2_{16}$

$2FE_{16}$

$FD2_{16}$

4.Convert the following binary number to decimal. 01011_2

11

35

15

10

5.Convert the binary number 1001.0010_2 to decimal.

90.125

9.125

125

12.5

6.Convert the following octal number to decimal. 17_8

51

82

57

15

7.Convert the following binary number to octal. 010111100_2

172_8

272_8

174_8

274_8

8.How many binary digits are required to count to 100_{10}?

7

2

3

100

9.The BCD number for decimal 347 is _____.

1100 1011 1000

0011 0100 0111

0011 0100 0001

1100 1011 0110

10.The sum of 11101 + 10111 equals _____.

110011

100001

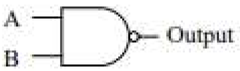
110100

100100

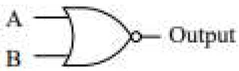
problems

Question 1

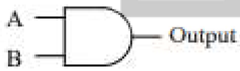
Identify each of these logic gates by name, and complete their respective truth tables:



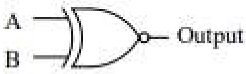
A	B	Output
0	0	
0	1	
1	0	
1	1	



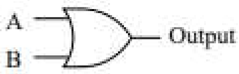
A	B	Output
0	0	
0	1	
1	0	
1	1	



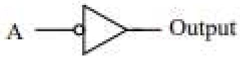
A	B	Output
0	0	
0	1	
1	0	
1	1	



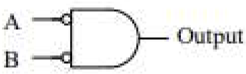
A	B	Output
0	0	
0	1	
1	0	
1	1	



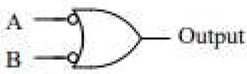
A	B	Output
0	0	
0	1	
1	0	
1	1	



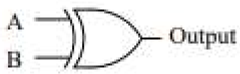
A	Output
0	
1	



A	B	Output
0	0	
0	1	
1	0	
1	1	



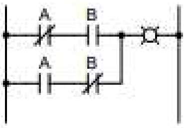
A	B	Output
0	0	
0	1	
1	0	
1	1	



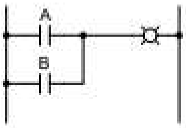
A	B	Output
0	0	
0	1	
1	0	
1	1	

Question 2

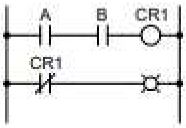
Identify each of these relay logic functions by name (AND, OR, NOR, etc.) and complete their respective truth tables:



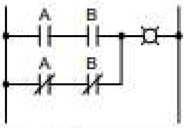
A	B	Output
0	0	
0	1	
1	0	
1	1	



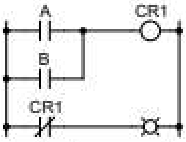
A	B	Output
0	0	
0	1	
1	0	
1	1	



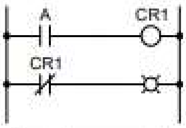
A	B	Output
0	0	
0	1	
1	0	
1	1	



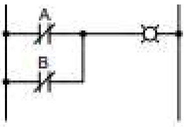
A	B	Output
0	0	
0	1	
1	0	
1	1	



A	B	Output
0	0	
0	1	
1	0	
1	1	

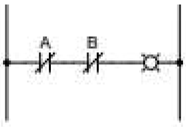


A	Output
0	
1	



A	B	Output
0	0	
0	1	
1	0	
1	1	

A	B	Output
0	0	
0	1	
1	0	
1	1	



A	B	Output
0	0	
0	1	
1	0	
1	1	

Question 3

The following set of mathematical expressions is the complete set of "times tables" for the Boolean number system:

$$0 \times 0 = 0$$

$$0 \times 1 = 0$$

$$1 \times 0 = 0$$

$$1 \times 1 = 1$$

Now, nothing seems unusual at first about this table of expressions, since they appear to be the same as multiplication understood in our normal, everyday system of numbers. However, what is unusual is that these four statements comprise the entire set of rules for Boolean multiplication! Explain how this can be so, being that there is no statement saying $1 \times 2 = 2$ or $2 \times 3 = 6$. Where are all the other numbers besides 0 and 1?

Question 4

Boolean algebra is a strange sort of math. For example, the complete set of rules for Boolean addition is as follows:

$$0 + 0 = 0$$

$$0 + 1 = 1$$

$$1 + 0 = 1$$

$$1 + 1 = 1$$

Suppose a student saw this for the very first time, and was quite puzzled by it. What would you say to him or her as an explanation for this? How in the world can 1 + 1 = 1 and not 2? And why are there no more rules for Boolean addition? Where is the rule for 1 + 2 or 2 + 2?

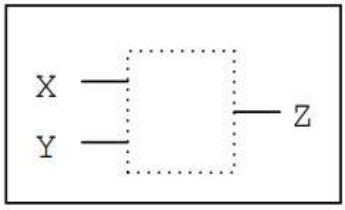
Question 5

There are three fundamental operations in Boolean algebra: addition, multiplication, and inversion. Each of these operations has an equivalent logic gate function and an equivalent relay circuit configuration. Draw the corresponding gate and ladder logic diagrams for each:

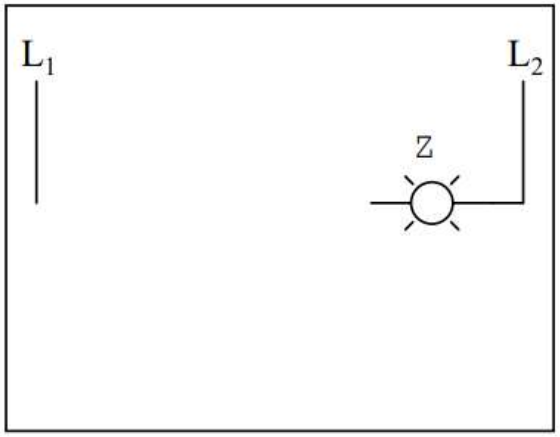
Boolean addition

$Z = X + Y$

Logic gate for addition



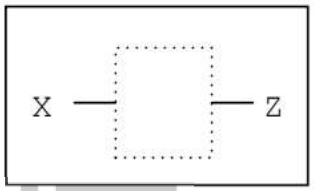
Ladder logic circuit for addition



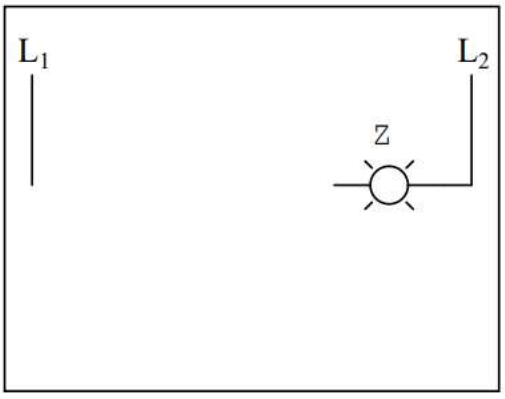
Boolean inversion

$Z = \overline{X}$

Logic gate for inversion

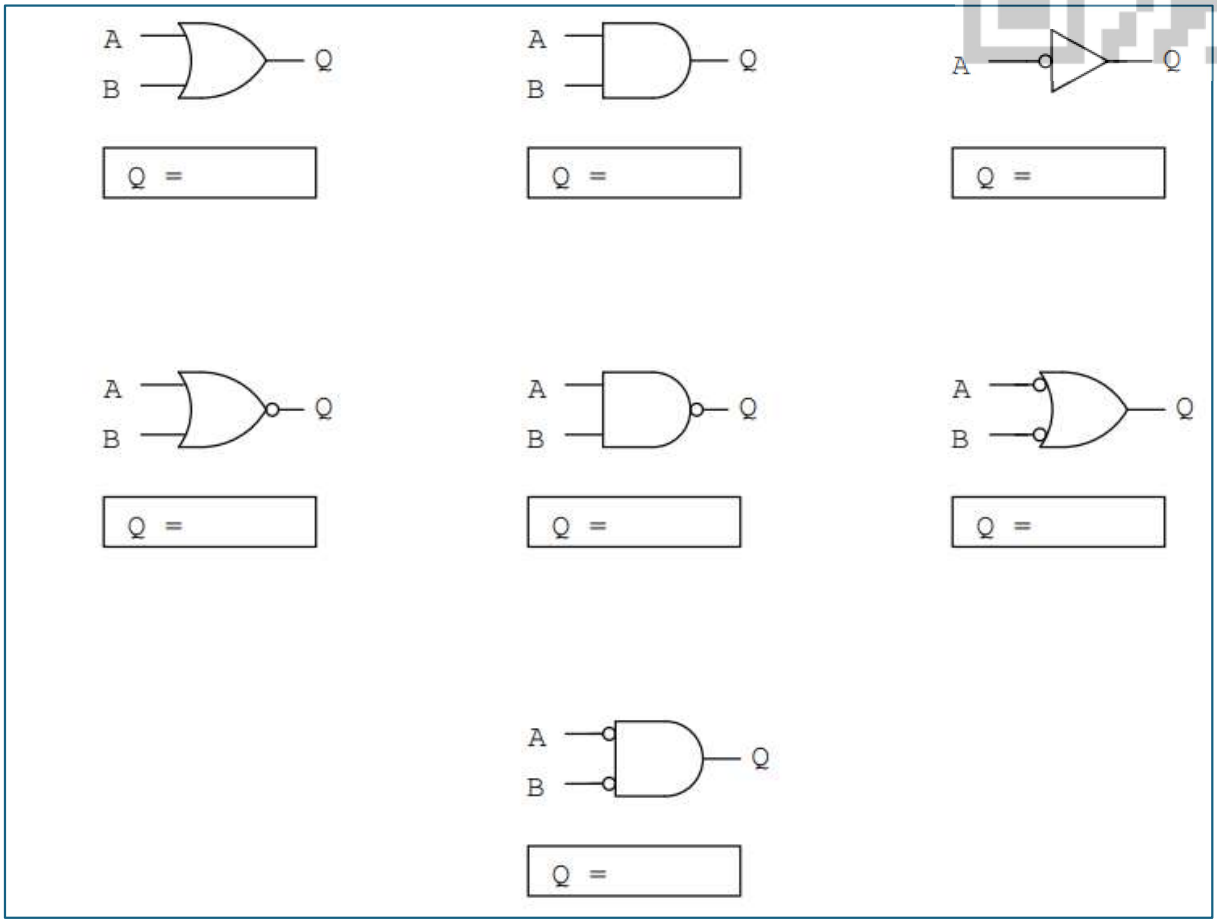


Ladder logic circuit for inversion



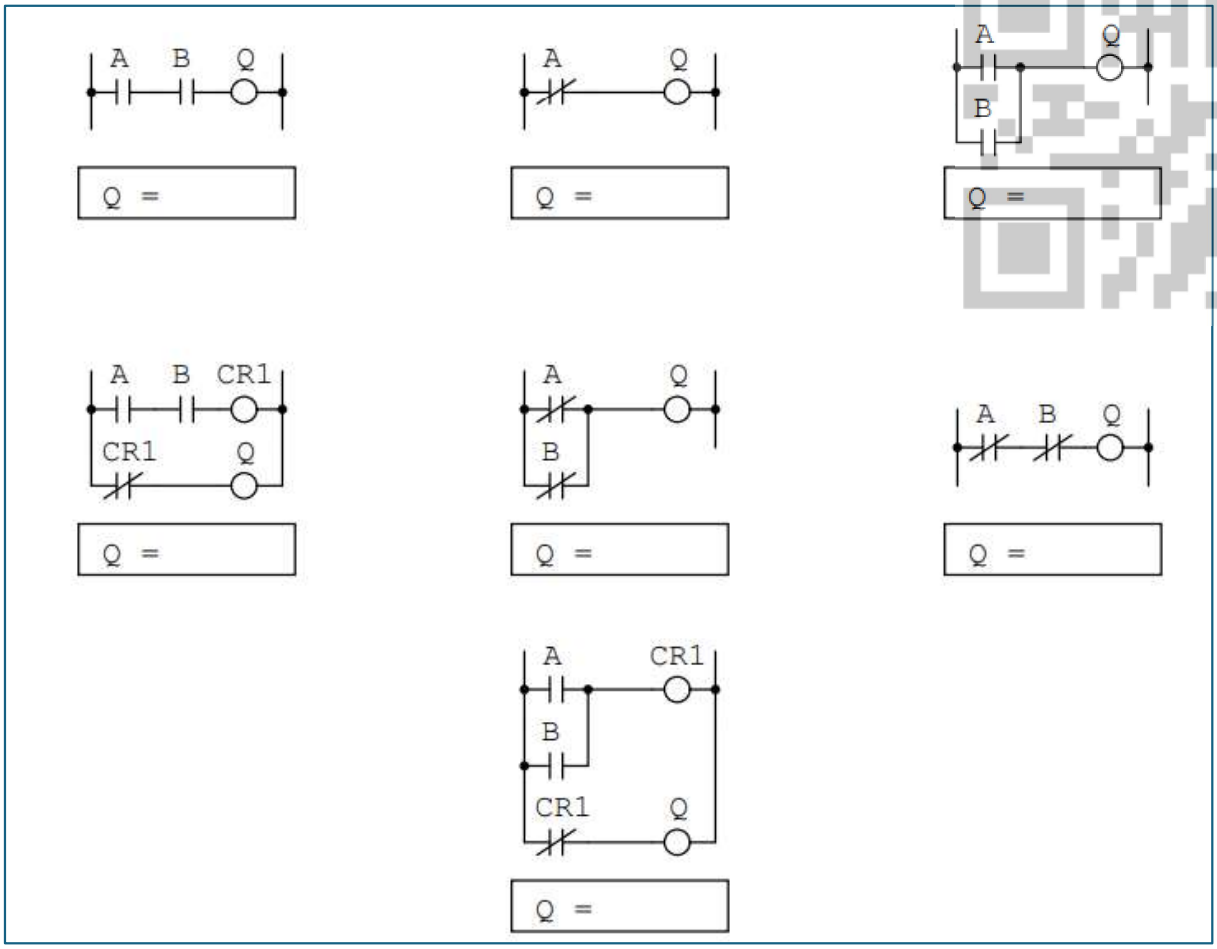
Question 6

Write the Boolean expression for each of these logic gates, showing how the output (Q) algebraically relates to the inputs (A and B):



Question 7

Write the Boolean expression for each of these relay logic circuits, showing how the output (Q) algebraically relates to the inputs (A and B):



PART-A (Marks)

1. What are Logic gates?

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2. What are the basic digital logic gates?

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3. What is BCD adder?

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4. What is Magnitude Comparator?

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5. What is code conversion?

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6. Draw the logic circuit of full adder using half adder

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7. What is code converter?

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8. Define Combinational circuit.

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9. Define sequential circuits

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10. What is Binary parallel adder?

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PART-B

1. Design a combinational logic circuit to convert the Gray code into Binary code (16)

2. Draw the truth table and logic diagram for full-Adder (16)

3. Draw the truth table and logic diagram for full-Subtractor (16)

4. Explain Binary parallel adder. (16)

5. Design a combinational logic circuit to convert the BCD to Binary code (16)