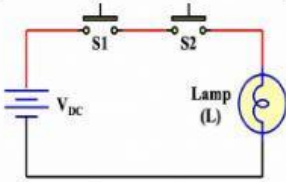
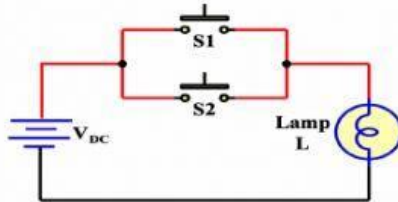
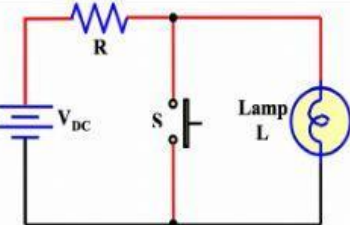
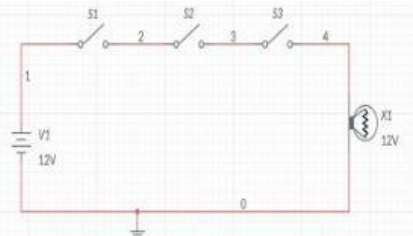


Q1) Study each circuit then complete the truth table next to each one of them.

**Note: High = ON = Closed switch = Logic State (1) = 5 V**

**Low = OFF = Open Switch = Logic State (0) = 0 V**

Circuit	Table	Relationship between inputs	Numerical Boolean Function																																				
	<table><tr><th>S1</th><th>S2</th><th>L</th></tr><tr><td>OFF</td><td>OFF</td><td></td></tr><tr><td>OFF</td><td>ON</td><td></td></tr><tr><td>ON</td><td>OFF</td><td></td></tr><tr><td>ON</td><td>ON</td><td></td></tr></table>	S1	S2	L	OFF	OFF		OFF	ON		ON	OFF		ON	ON		Lamp will turn ON if both S1 ..... S2 were ON.	$L = S1 * S2$																					
S1	S2	L																																					
OFF	OFF																																						
OFF	ON																																						
ON	OFF																																						
ON	ON																																						
	<table><tr><th>S1</th><th>S2</th><th>L</th></tr><tr><td>LOW</td><td>LOW</td><td></td></tr><tr><td>LOW</td><td>HIGH</td><td></td></tr><tr><td>HIGH</td><td>LOW</td><td></td></tr><tr><td>HIGH</td><td>HIGH</td><td></td></tr></table>	S1	S2	L	LOW	LOW		LOW	HIGH		HIGH	LOW		HIGH	HIGH		Lamp will turn ON if at least S1 .. S2 was ON.	$L = S1 \dots S2$																					
S1	S2	L																																					
LOW	LOW																																						
LOW	HIGH																																						
HIGH	LOW																																						
HIGH	HIGH																																						
	<table><tr><th>S</th><th>L</th></tr><tr><td>0</td><td></td></tr><tr><td>1</td><td></td></tr></table>	S	L	0		1		Lamp will turn .... When the S is OFF.	$L = \bar{S}$																														
S	L																																						
0																																							
1																																							
	<table><tr><th>S1</th><th>S2</th><th>S3</th><th>L</th></tr><tr><td>0</td><td>0</td><td>0</td><td></td></tr><tr><td>0</td><td>0</td><td>1</td><td></td></tr><tr><td>0</td><td>1</td><td>0</td><td></td></tr><tr><td>0</td><td>1</td><td>1</td><td></td></tr><tr><td>1</td><td>0</td><td>0</td><td></td></tr><tr><td>1</td><td>0</td><td>1</td><td></td></tr><tr><td>1</td><td>1</td><td>0</td><td></td></tr><tr><td>1</td><td>1</td><td>1</td><td></td></tr></table>	S1	S2	S3	L	0	0	0		0	0	1		0	1	0		0	1	1		1	0	0		1	0	1		1	1	0		1	1	1		Lamp will turn ON when all switches are closed.	$L = S1 * S2 * S3$
S1	S2	S3	L																																				
0	0	0																																					
0	0	1																																					
0	1	0																																					
0	1	1																																					
1	0	0																																					
1	0	1																																					
1	1	0																																					
1	1	1																																					

Q2) a. What is the number of input combinations for 4 inputs digital circuit?

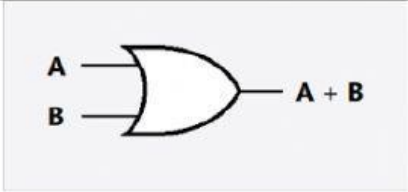
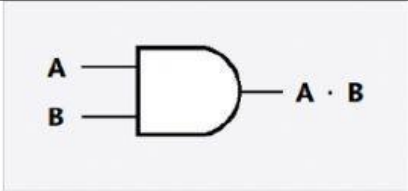
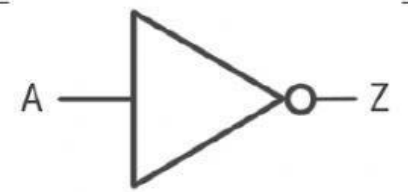
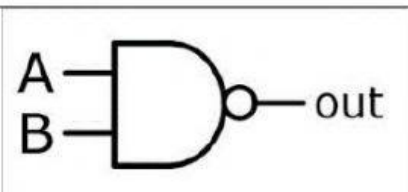
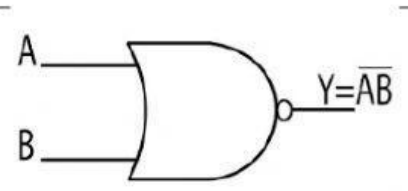
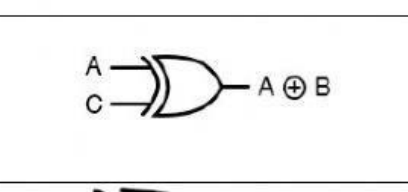
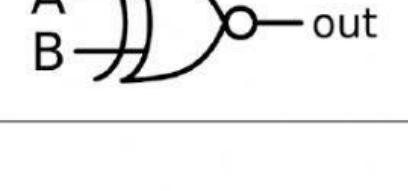
**Hint: use the formula  $2^N$  where N is number of inputs.**

**Number of input combinations = ..... inputs**

b. What is the number of input combinations for 5 inputs digital circuit?

**Number of input combinations = ..... inputs**

Q3) Match the logic gate symbol with its name and Boolean function of the gate output.  
Copy the number to its correct place, The first one is done for you.

No.	Gate symbol	Matching number	Gate Name and Boolean function
1			XOR Output= $A \oplus B = A\bar{B} + \bar{A}B$
2			NOR Output= $\overline{A + B}$
3			XNOR Out= $\overline{(A \oplus B)} = (A.B + \bar{A}.\bar{B})$
4		1	OR Output = $A + B$
5			NAND Output = $\overline{A.B}$
6			NOT Output= $\bar{A}$
7			AND Output= $A \cdot B$