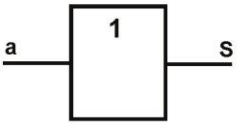
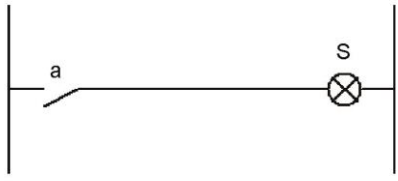
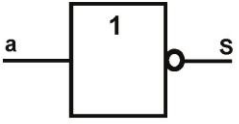
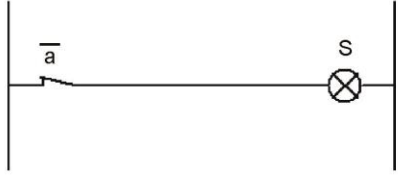
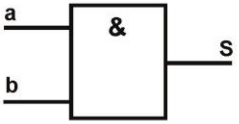
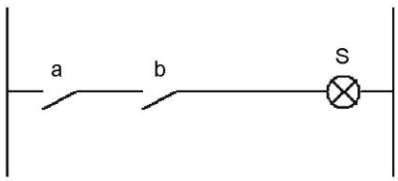
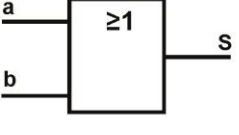



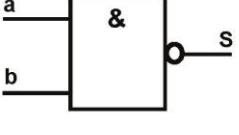
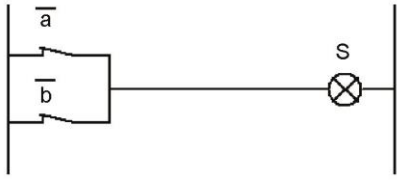
BUT

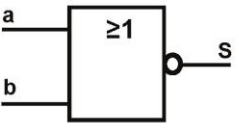
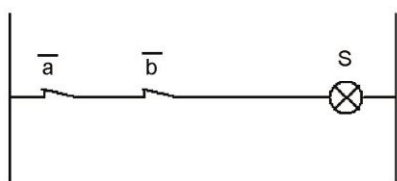
Connaitre les différentes fonctions logiques ainsi que leurs associations.
Déterminer les équations logiques par rapport aux logigrammes.

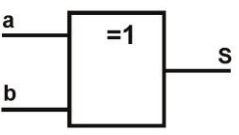
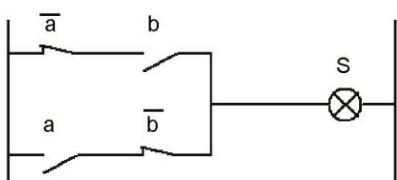
1) Les fonctions logiques.

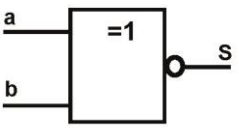
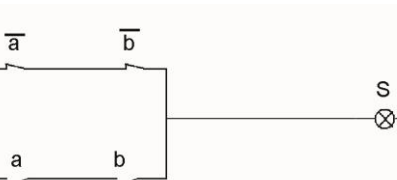
Fonction OUI																	
Symbole logique	Schéma à contacts	Table de vérité															
		<table border="1" style="margin: auto;"> <thead> <tr> <th>a</th> <th>S</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> </tr> <tr> <td>1</td> <td>1</td> </tr> </tbody> </table>	a	S	0	0	1	1									
a	S																
0	0																
1	1																
Équation logique																	
$S = a$																	
Fonction NON																	
Symbole logique	Schéma à contacts	Table de vérité															
		<table border="1" style="margin: auto;"> <thead> <tr> <th>a</th> <th>S</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>1</td> </tr> <tr> <td>1</td> <td>0</td> </tr> </tbody> </table>	a	S	0	1	1	0									
a	S																
0	1																
1	0																
Équation logique																	
$S = \bar{a}$																	
Fonction ET																	
Symbole logique	Schéma à contacts	Table de vérité															
		<table border="1" style="margin: auto;"> <thead> <tr> <th>a</th> <th>b</th> <th>S</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>0</td> <td>1</td> <td>0</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> </tr> </tbody> </table>	a	b	S	0	0	0	0	1	0	1	0	0	1	1	1
a	b	S															
0	0	0															
0	1	0															
1	0	0															
1	1	1															
Équation logique																	
$S = a \cdot b$																	

Fonction OU																	
Symbole logique	Schéma à contacts	Table de vérité															
		<table border="1"> <thead> <tr> <th>a</th> <th>b</th> <th>S</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>0</td> <td>1</td> <td>1</td> </tr> <tr> <td>1</td> <td>0</td> <td>1</td> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> </tr> </tbody> </table>	a	b	S	0	0	0	0	1	1	1	0	1	1	1	1
a	b	S															
0	0	0															
0	1	1															
1	0	1															
1	1	1															
Équation logique																	
$S = a + b$																	

Fonction NON-ET (NAND)																	
Symbole logique	Schéma à contacts	Table de vérité															
		<table border="1"> <thead> <tr> <th>a</th> <th>b</th> <th>S</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>1</td> </tr> <tr> <td>0</td> <td>1</td> <td>1</td> </tr> <tr> <td>1</td> <td>0</td> <td>1</td> </tr> <tr> <td>1</td> <td>1</td> <td>0</td> </tr> </tbody> </table>	a	b	S	0	0	1	0	1	1	1	0	1	1	1	0
a	b	S															
0	0	1															
0	1	1															
1	0	1															
1	1	0															
Équation logique																	
$S = \overline{a \cdot b}$																	

Fonction NON-OU (NOR)																	
Symbole logique	Schéma à contacts	Table de vérité															
		<table border="1"> <thead> <tr> <th>a</th> <th>b</th> <th>S</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>1</td> </tr> <tr> <td>0</td> <td>1</td> <td>0</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> </tr> <tr> <td>1</td> <td>1</td> <td>0</td> </tr> </tbody> </table>	a	b	S	0	0	1	0	1	0	1	0	0	1	1	0
a	b	S															
0	0	1															
0	1	0															
1	0	0															
1	1	0															
Équation logique																	
$S = \overline{a + b}$																	

Fonction OU exclusif (XOR)																	
Symbole logique	Schéma à contacts	Table de vérité															
		<table border="1"> <thead> <tr> <th>a</th> <th>b</th> <th>S</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>0</td> <td>1</td> <td>1</td> </tr> <tr> <td>1</td> <td>0</td> <td>1</td> </tr> <tr> <td>1</td> <td>1</td> <td>0</td> </tr> </tbody> </table>	a	b	S	0	0	0	0	1	1	1	0	1	1	1	0
a	b	S															
0	0	0															
0	1	1															
1	0	1															
1	1	0															
Équation logique																	
$S = b \oplus a$																	

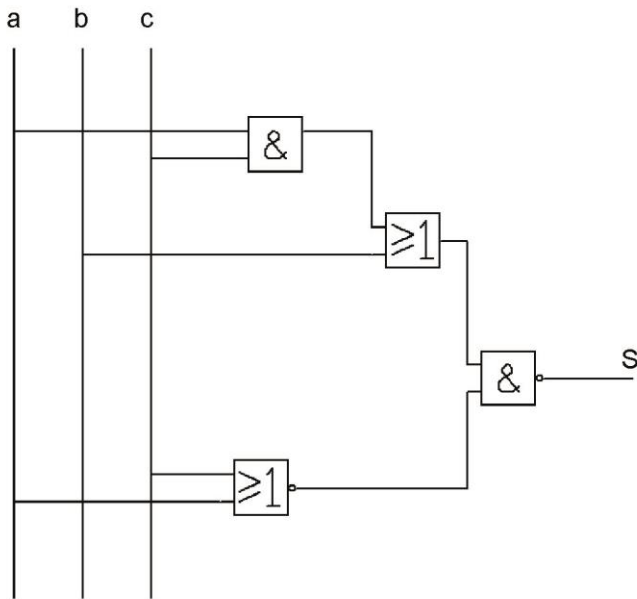
Fonction NON-OU exclusif (XNOR)																	
Symbole logique	Schéma à contacts	Table de vérité															
		<table border="1"> <thead> <tr> <th>a</th> <th>b</th> <th>S</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>1</td> </tr> <tr> <td>0</td> <td>1</td> <td>0</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> </tr> </tbody> </table>	a	b	S	0	0	1	0	1	0	1	0	0	1	1	1
a	b	S															
0	0	1															
0	1	0															
1	0	0															
1	1	1															
Équation logique																	
$S = \overline{a \oplus b}$																	

Remarque : il existe également les fonctions ET exclusif (XAND) et NON-ET exclusif (XNAND).

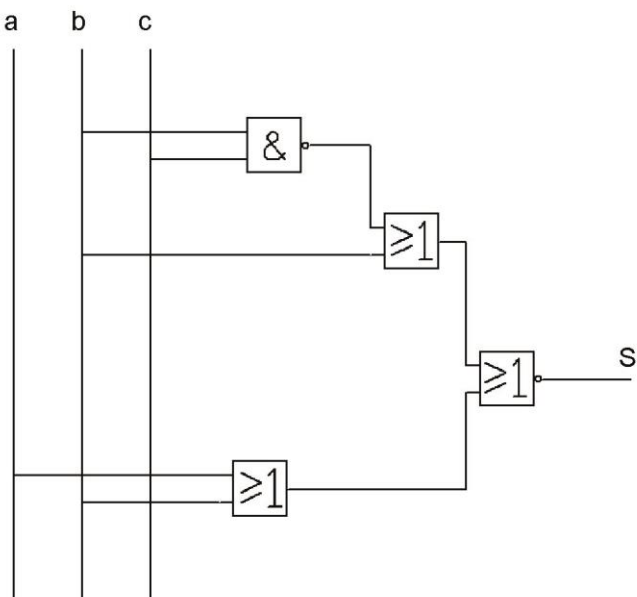
2) Logigrammes et équations logiques.

Exercice 1

Pour les 2 schémas logiques appelés logigrammes, trouvez les équations logiques :

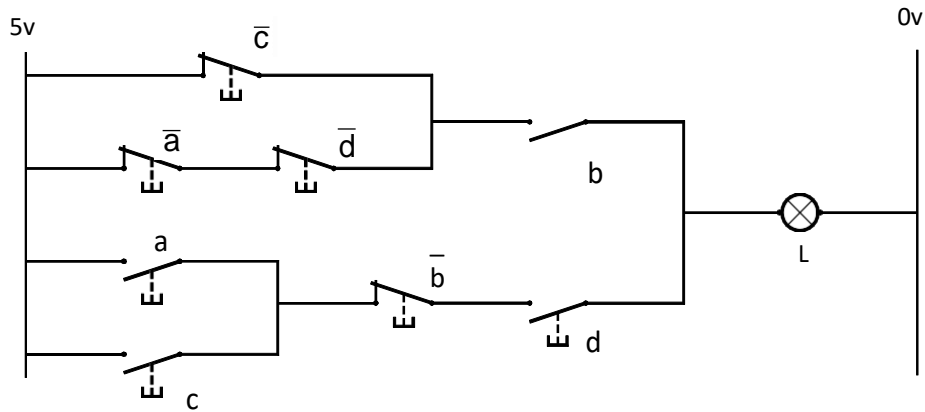


$$S = \overline{(ac+b)} \overline{(a+c)}$$



$$S = \overline{bc} + b + a + b$$

Exercice 2



a) Donner la fonction logique (équation) du circuit ci-dessus.

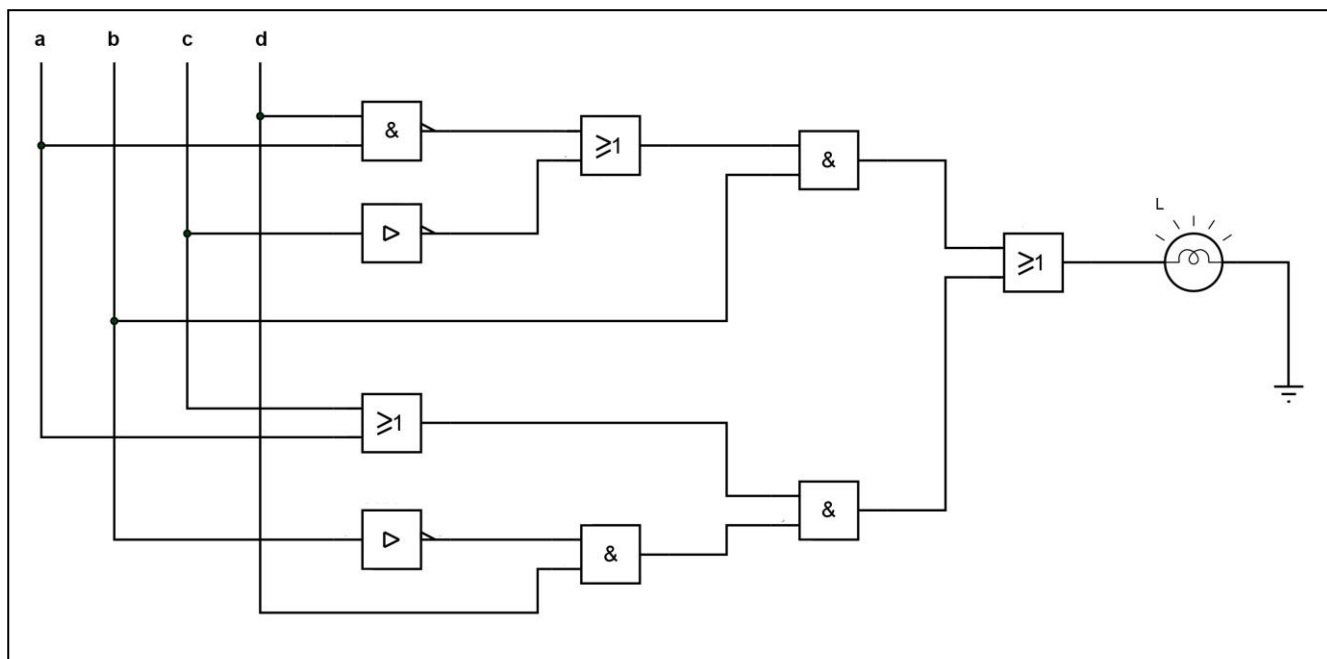
Soit la fonction $L=f(a,b,c,d)$.

$$L = [(\bar{c} + (a \cdot d)) \cdot b] + [(a + c) \cdot \bar{b} \cdot d]$$

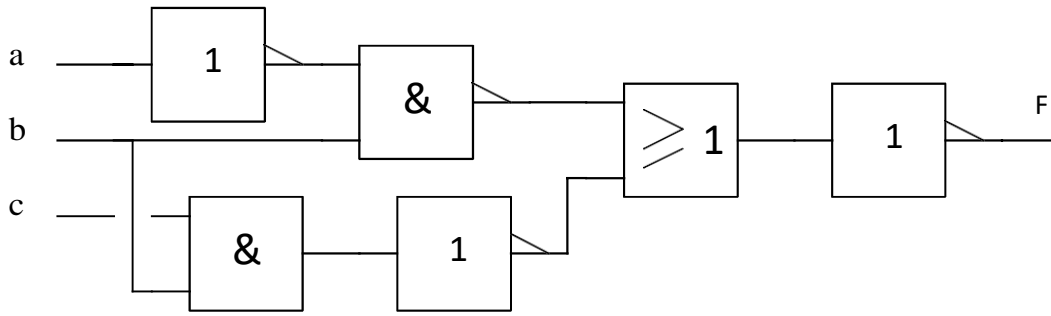
a	b	c	d	L
0	0	0	0	0
0	0	0	1	0
0	0	1	0	0
0	0	1	1	1
0	1	0	0	1
0	1	0	1	1
0	1	1	0	1
0	1	1	1	0
1	0	0	0	0
1	0	0	1	1
1	0	1	0	0
1	0	1	1	1
1	1	0	0	1
1	1	0	1	1
1	1	1	0	0
1	1	1	1	0

b) En déduire la table de vérité de L. \longrightarrow

c) Donner le logigramme de cette fonction.



Exercice 3



1) D'après le logigramme ci-dessus, retrouver l'expression algébrique de F et simplifier la, si possible.

$$F = \overline{\overline{a} \cdot b} + \overline{b \cdot c}$$

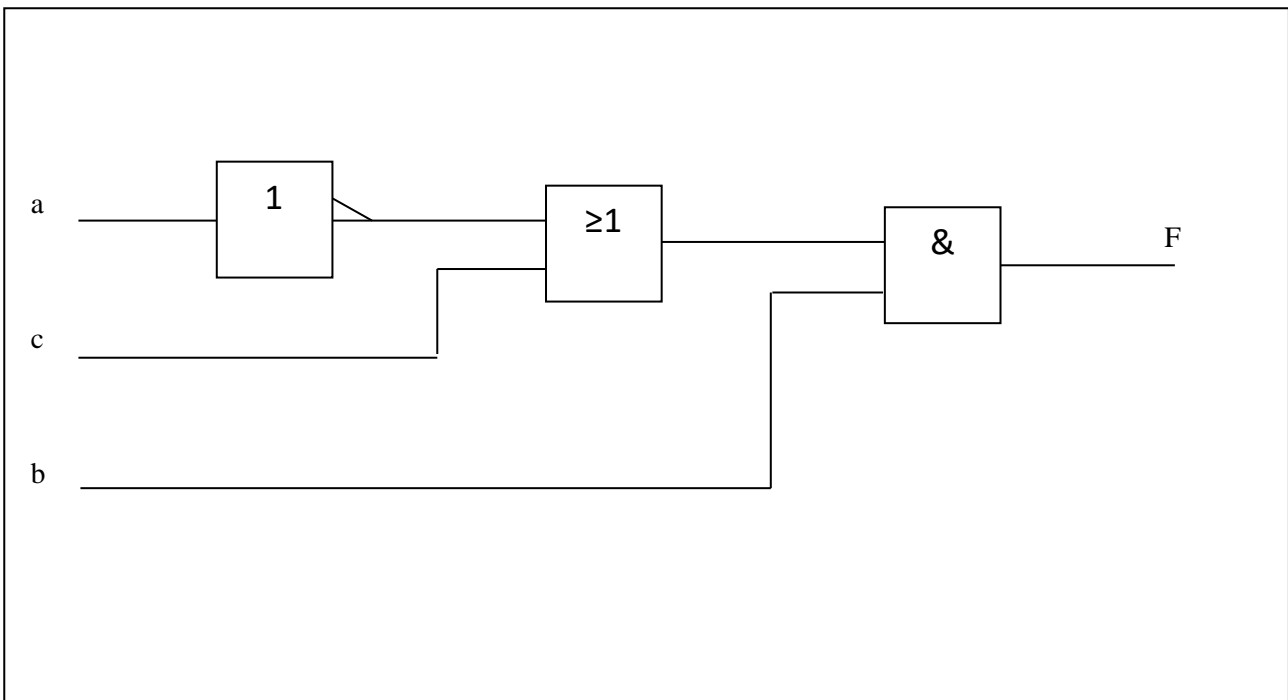
Simplification :

$$F = \overline{\overline{a} \cdot b} + \overline{b \cdot c}$$

$$F = \overline{\overline{a} + c} \cdot b$$

$$\text{Soit } F = \overline{\overline{a} + c} \cdot b = (\overline{\overline{a} + c}) b$$

2) Donner le logigramme de la fonction simplifiée.



Exercice 4

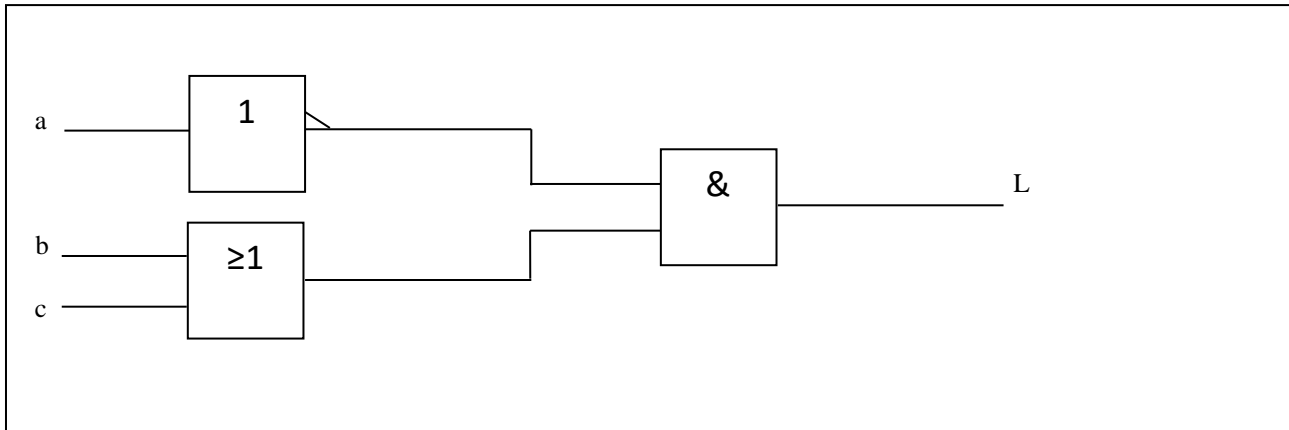
Soit l'équation suivante :

$$L = \bar{a} \cdot (c + b)$$

a) Compléter la table de vérité.

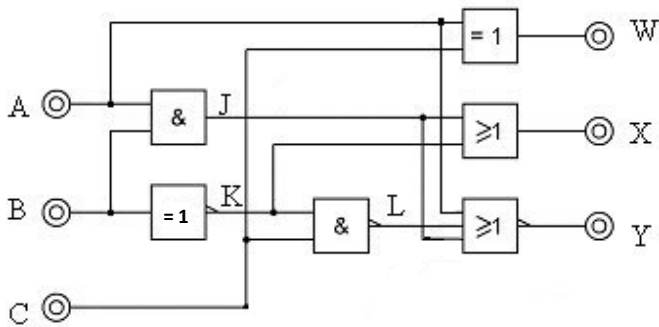
a	b	c	L
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	0
1	0	1	0
1	1	0	0
1	1	1	0

b) Construire le schéma électrique correspondant.



Exercice 5

Compléter la table de vérité puis le chronogramme ci-dessous en fonction du logigramme.



A	B	C	J	K	L	W	X	Y
0	0	0	0	1	1	0	1	0
0	0	1	0	1	0	1	1	1
0	1	0	0	0	1	0	0	0
0	1	1	0	0	1	1	0	0
1	0	0	0	1	1	1	1	0
1	0	1	0	1	0	0	1	0
1	1	0	1	0	1	1	1	0
1	1	1	1	0	1	0	1	0

