

TD Series N°. 3 Combinatorial and Sequential Logic

Exercise 1

Determine the minimum expression of:

$F = a.b.\bar{c} + a.b.c + \bar{a}.d.e + a.\bar{b}.c + \bar{b}.d$ algebraically and then verify the result by the Karnaugh method.

Exercise 2

Prove algebraically that: $a.\bar{b} + \bar{a}.b + b.c = a.\bar{b} + \bar{a}.b + a.c$

Exercise 3

Simplify the following logical function by Karnaugh table:

$$F_{abcde} = \sum (4,5,6,8,9,13,14,15,22,24,25,30,31)$$

Exercise 4

A two-speed electric motor can be controlled by two push buttons (a) and (b):

- 1- At rest (a) and (b) are not actuated.
- 2- Action on (a) only: the motor turns slowly.
- 3- Simultaneous action on (a) and (b): the motor turns quickly.
- 4- (a) released and (b) actuated: the motor turns quickly.
- 5- (b) released and (a) released: the motor stops.

Determine the installation diagram.