



- 4) Mention the Two ways used for developing the function trees in a product development. (2 marks)

- 5) Explain how to establish Best-in-Class Competitors by function. (2 marks)  
Solution:

- 6) Mention the four types of function-based modularity and express it using a simplified schematic. (2 marks)

**Question 2: Mechanical RE (5 marks)**

- 1) Mention one advantage and one weakness for the following three scanning systems: (3 marks)

Type of scanning	Advantage	Weakness
Laser		
CCD Camera		
Contact		

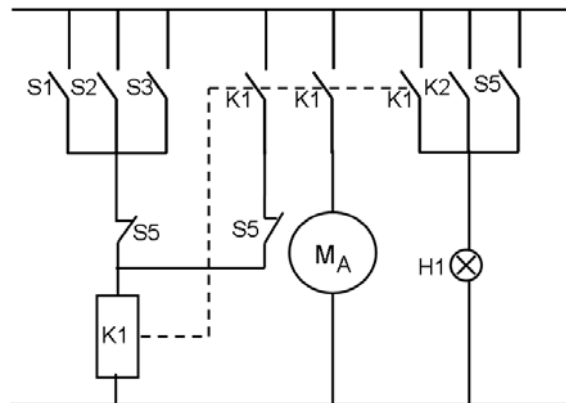


2) Which information and documentation is needed to RE a PCB? (4 marks)

3) What are the two goals of the electronic RE? (2 marks)

**Question 4: Software RE (20 marks)**

1) Find the Boolean algebra expression for the following diagram: (5 marks)



2) Consider the mealy finite state (FSM) machine shown below:

a) What is the type of the Finite State Machine? (1 mark)

b) Convert the Automaton table into the Automaton graph. (3 marks)

	a	b	c	d
0/0	1	2	-	-
1/0	2	-	-	3
2/0	-	-	4	-
3/1	1	2	-	-
4/k	1	2	-	-

- 3) Consider the PLC Instruction list below. (9 marks)  
a) Write the IF-THEN-ELSE statement structure.  
b) Draw the FSM (state) diagram.

0000	:U	E 0.6
0001	:U	E 1.2
0002	:U	E 1.3
0003	:UN	E 0.4
0004	:=	M 120.0
0005	:U	E 0.0
0006	:U	M 100.0
0007	:O	
0008	:U	M 101.0
0009	:U	M 120.0
000A	:UN	M 102.0
000B	:SPB	LAB1
000C	:U	E 38.1
000D	:U	E 18.3
000D	:U	E 20.4
000E	:S	A 1.1
0012	:SPA	LAB2
0014 LAB1	:U	E 20.7
0016	:=	A 15.0
001B	LAB2	:BE

**Philadelphia University  
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**Student Name:  
Student Number:**

Best of Luck