

Course title: Automated Industrial System

Course code: EE512

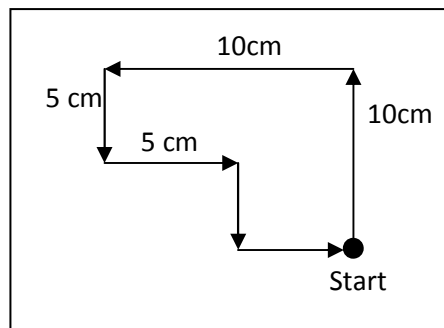
Sheet #5

Design the control circuits using ladder diagram of the following applications:

- 1- A 4 pumps, 4 switch system operates in the following form:
PUMP1 is on when switch 1 and switch2 are on or switch2 and switch3 are on.
PUMP2 is on when two or more switches are on.
PUMP3 is on when any three switches are on or switch 4 is on.
PUMP4 is on when any two pumps are on.

(Use Karnaugh map to simplify the design).

- 2- A CNC machine is to cut out the following shape:



The drill starts operation at the Start point. The drill is moved in the four directions via two motors. The motors move at 0.5sec/cm. After the shape is cut out the machine is stopped until restarted again.

- 3- A push button is used to operate a flasher bulb. If the push button is pressed once, the flasher bulb flashes for 5 seconds. If pressed twice, bulb flashes for 10 seconds. If pressed three times, bulb flashes for 15 seconds. After that time the system waits for the push button to be pressed again.