

Course title: Automated Industrial System

Course code: EE512

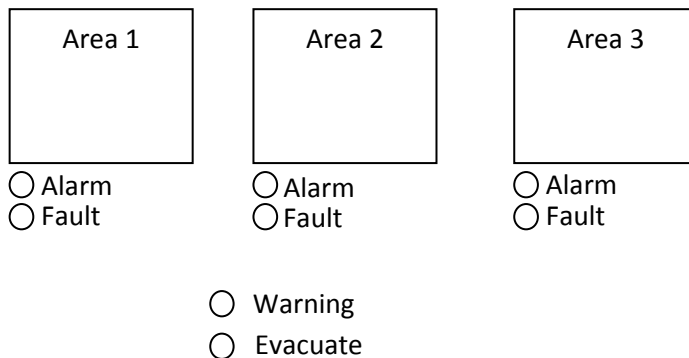
Sheet #2

Try to design the power, connections and control circuits using ladder diagram mentioning all the devices used for the following applications:

- 1- 3 phase induction motor Y/ $\Delta$  operation in 3 seconds.
- 2- Design a flasher circuit.
- 3- Design an on delay timer operation using off delay timer.
- 4- For 3 pumps system, when start push button is pressed:
  - a) Pump 1 is on for 10 seconds then stop
  - b) Pump 2 is on for 1 second then stop
  - c) Wait for 5 seconds
  - d) Pump 3 is on for 20 seconds then stop.
  - e) Repeat the entire process.

If stop push button is pressed at any time all the 3 pumps should be stopped.

- 5- Design a flasher circuit that should flash two indicators three times each.
- 6- Count the number of people in a store. The store has an entrance, exit door and a maximum capacity of 10 people. When the maximum capacity is reached a flasher circuit indicates that the store is full.
- 7- Design a fire alarm system for Fig.1 with the following operation sequence:



- The **Alarm** in each area will be **ON** in case the **smoke detector** in that area is **ON** for **more than 10 seconds**.
- If the **smoke detector** is **ON** and **OFF 5 times** before the alarm going ON. The **Fault** indicator should be on.
- If **Fault** indicator is **ON** the **Alarm** in that area should never go **ON** and vice versa.
- The **Warning** indicator is **ON** in case any area's alarm is on.
- The **Evacuate** indicator is **ON** in case any two area's alarm is on.