Andhra Pradesh State Skill Development Corporation

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Basics of PLC

A Task on Timer Operations

EXAMPLES:

1. **Use of logic gates**

- There are three switches s1, s2 and s3, and, there are three lamps L1,L2 and L3.
- If any of switch s1, s2 and s3 is "ON", then lamp L1 must glow. (L2 & L3 must be "off")
- If any 2 switches among s1, s2 and s3 are "ON", then lamp L2 must glow. (L 1& L3 must be off)
- If all three switches are "ON", then lamp L3 must glow. (L1 & L2 must be off)

2. **Use of "Clock Memory" function(Fan Control Unit)**

There are three fans: Fan f1,fan f2 & "Stand-By" fan f3 along with a Main Contactor.

- Fans start only after Main Contactor is started. A push button is used to start main contactor.
- If any one fan fails then "Stand-By" fan f3 goes "ON".
- If any two fans fail, then main contactor must stop and a lamp must flash at 5 Hz frequency.

Note: here fan failure indication is to provide by input switches.

3. **Use of "SET-RESET" function (forward-reverse)**

- A motor can be rotated in forward direction as well as in reverse direction.
- The motor is supplied power through a "Main Contactor" along-with an "Over-Load protection relay".
- There are two separate contactors for forward and reverse directions of motor, in parallel, with one input phase is interchanged for reverse direction.
- The contactors for forward-reverse are supplied power through Main Contactor.
- There are 2 switches "Stop" and "Start" for controlling Main Contactor.
- Now to rotate motor in forward direction switch s1 is used and for reverse direction switch s2 is used.
- To change direction of motor, the motor must first be stopped and then the forward or reverse switch must be pressed.
- When "stop" button is pressed or OLR trips the motor must get disconnected from power supply.
- If motor is in stop mode "OFF" LED must glow, if motor stopped due to "OLR tripping" "Fault" LED must glow.

4. **Use of "Comparator" function**

- A temperature sensor is used to monitor the temperature of a process continuously.
- If process temperature is between 95 to 105 degrees then lamp L1 must be "Steady-ON".

- If temperature is less than 95 degrees then lamp L! must flash slowly.
- If temperature is more than 105 degrees then lamp L1 must flash fastly.

5. **Use of "Rising edge & Falling Edge" function**
   - On the first press of a remote button, television must switch "ON".
   - On the second press of button television must switch "OFF".

6.Use of Timer function:

- When a "Start" button is pressed, Lamp L1 and lamp L2 must glow in such a way that when L1 is ON,L2 must be OFF and vice-a-versa. This opposite blinking is a continuous process and will only be stopped when Start button is released.

7. Use of Timer function:

- There are two push buttons "START" & "STOP".
- When "start" is pressed Conveyor 1 must switch ON and Conveyor 2 must start 5secs after Conveyor 1 has started.
- When pressing "stop" conveyor 2 switches "off" immediately and conveyor 1 stops 10 secs after the conveyor 2 has stopped.

8.Use of Timer function:

- Motor 1 must be ON 5 secs after "Start" push-button is pressed. Motor 2 will start 5 secs after motor 1 is On and
- 3 will start 5 secs after motor 2 is on.
- When "stop" is pressed, motor 3 gets "off" after 5secs, motor 2 gets "off" 5 secs after motor 3 stops and motor 1 gets off 5 secs after motor 2 stops.

9.Use of Timer Function:

- When pressing "Start" button immediately the motor, fan and pump must start.
- When pressing "Stop", pump switches off 7 secs after stop is pressed, fan switches off 10 secs after the pump is off and motor switches off 15 secs after fan is off.

10.Use of Timer function(Traffic signal)

- When "start" switch is pressed RED light goes on for 10 secs
- Yellow light goes ON for 7 secs after red light goes off
- Green light goes ON for 15 secs after yellow is off.

- When releasing Start button process must stop.

11.Use of "UP-Down Counter" function

- There is an "Entry" and "Exit" in a parking area. Car is sensed at Entry and Exit.
- When there is no car in parking area Yellow light must be ON.
- When there are cars between 1-9 present in parking area, Green light must be ON.
- When there are 10 cars Red light must be on.

12.Use of "UP-Counter"

- There is a selector switch s1, one "start" button and one "stop" button.
- IF S.S pressed one along with start button then motor 1 must be ON.
- If S.S is pressed two times along with Start then motor 2must be ON.
- If S.S is pressed three times along with Start motor 3 must be ON.
- IF S.S pressed one time along with stop button then motor 1 must be OFF.
- If S.S is pressed two times along with Stop then motor 2 must be OFF.
- If S.S is pressed three times along with Stop motor 3 must be OFF.

13.Use of "Comparators & math functions"

- In a Biscuit manufacturing company, there is one packaging line for Sweet biscuits and a separate packaging line for Salt biscuits.
- A customer has ordered 15 sweet biscuit packets and 10 salt biscuit packets.
- Salt biscuits packaging line has to start after 5 sweet biscuit packets are already packed.
- When his order of sweet biscuits is packed L1 must be high and when his order of salt biscuits is packed L2 must be high.
- Once his complete order is ready for loading L3 must be high.