Name of subject: INDUSTRIAL AUTOMATION

Subject code   : 17664   **Unit Test: II**

Semester   : VI   **Course   : IS/IE**

CHAPTER 3 PLC HARDWARE

3 Marks

1. Explain concept of sinking & sourcing with respect to PLC.
2. State the following with respect to PLC
     i)   Program files. ii) Data files
3. Draw the block diagram DC input module.
4. Classify the following devices in to input and output devices with respect to PLC.
       Pressure switch, Thermocouple, Motor, Push Button, Solenoid Valve, toggle Switch, Stepper Motor, Level Switch, Lamp, RTD, LED, Sensor
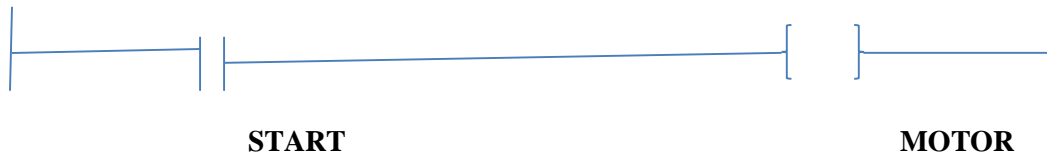
4 Marks

5. Illustrate the concept of sinking type of DC input module.
6. Draw wiring diagram for input device that measures pressure and gives discrete output in PLC.
7. Draw labeled diagram of DC input module. Write the operation of isolation of optical Isolator.
8. If Input the addressing of PLC is I1: 2.0/3, what does I, 1,2,0,3 indicate?
9. List any four I/O module selection criteria on the basis of
     i)   Number of inputs or outputs.
     ii)   Type of inputs or outputs.
     iii)   Wiring type.
     iv)   Application
10. Draw block diagram of analog input module .State the function of each block
11. Draw DC output module, state the function of each block.
12. Draw block diagram of 4 wires RTD input module.

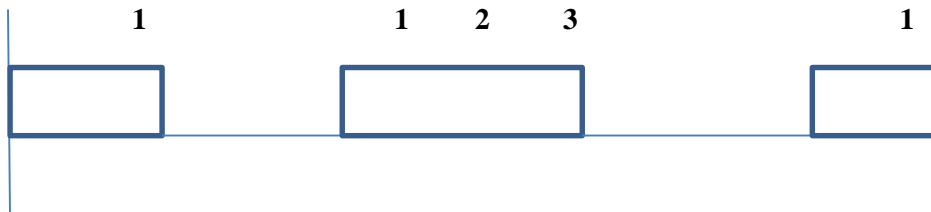## CHAPTER 5 PLC PROGRAMMING & APPLICATION

3 Marks

13. Explain UP counter format with timing diagram.
14. Explain Down counter format with timing diagram.

15. If the start button is a push button, if it is pressed motor becomes on. Even though it is released motor should be on. Which instruction is to be used and why?

START   **MOTOR**

16. For TON instruction of preset value 2 sec, draw timing diagram for EN,TT,DN bit for the following input.

1   1   2   3   1

4 Marks

17. Write a ladder program for blinking of LED with delay of 1 sec.
18. Write a ladder program to measure frequency using timer and counter instruction.
19. Write a ladder logic for traffic light control for following conditions:
    I1: start
    I2: stop
    Q1: Red light
    Q2: Green light
    Q3: Yellow light
    When start button pressed RED light should ON& remain ON for 5 Sec. RED light should become OFF & GREEN light should ON & remain ON for 7 Sec. GREEN light should become OFF & YELLOW light should ON& remain ON for 3 Sec. After 3sec YELLOW light should become off. & again RED light should become ON & cycle is repeated.
20. Program list (any one)
a) Write a ladder program for following conditions.
    a. When start button is pressed, motor M1 is started
    b. After 5 sec motor M1 stops and motor M2 starts.
    c. After 5 sec motor M2 stops and motor M3 starts.
    d. When stop button is pressed motor M3 stops.
b) Write Ladder program for
        i. if A= B Led becomes on
        ii. if A≤ B Led becomes off
c) Draw a ladder diagram for 2 motor operations for following conditions.

i) Start push button starts motor M1 and motor M2.

ii) Stop push button stops motor M1 first then after 10 sec. motor M2

d) Draw the ladder diagram for a system uses special operation of fan. The fan is to come on 8 sec after a switch is turned on .it is then to run until 15 sec after the switch is turned on.

e) When start button pressed M2 will turn on at that time & M1 should turn on after 15 sec When stop button pressed M1 will turn off at that time & M2 should turn off after 10 sec.

f) The startup system includes three conveyor belts in sequence with delay of 5 sec between each start up C1, C2 & C3.

g) A conveyor belt is used to move an item to work station. The presence of the item at the work station is detected by means of limit switch. After 50 items sensed by limit switch, it stops the conveyor belt motor. The process is restarted by normally open reset button

h) Draw a ladder diagram for box packaging system having the following condition.
Five boxes are stacked at time & then bound with a wrapper. The box presence is done by limit switch. The wrapper machine take 50 sec time to wrap the boxes & process repeated.

i) A coal handling plant has three coal conveyors C1, C2 & C3. C1 is fed from the output of the crusher, C2 is mid belt & C3 pushes coal to the bunker. The requirements of the plant are as follow: C1 & C2 will be in ON mode only when C3 is on; C1 will be ON only when C2 & C3 are ON; C1 & C2 trip when C3 trips; C1 trips when C2 trips but C3 is ON & C1 trips when C2 & C3 trip. Design ladder logic for the above.

j) Draw a ladder logic for an agitator- motor system having following conditions:
Agitator starts, after 5 sec the pump can be started, when pump is switch off the agitator also stops, when agitator goes off it cannot be started for 3 Sec.

CHAPTER 5 PLC TROUBLESHOOTING & INSTALLATION

3 Marks

21. State any three precautions while placing PLC inside in an enclosure.
22. Why grounding is necessary for PLC during installation?
23. Explain troubleshooting of ladder program of PLC.

4 Marks

24. Illustrate fault detection technique for led status of input and output module.
25. During PLC installation, how noise suppression is done.
26. What are the parameters should be considered while installing the PLC? Explain any two