**Exercises-**

1. Implement common logic gates in Ladder diagram.
2. S1 ON L1 and L2 ON, S2 ON-L3 and L4 ON, S3 ON L5 and L6 ON.
3. S1 ON –L1 ON, S2 OFF- L2 ON.
4. S1-ON L1- ON;S2-off L2-on;S3 on l3 on ;S4-off l4 on
5. S1 on L1 on, S2 on L2 on ,L1-off; S3 on l3 on ,L2 off

**Latching**

**Exercises-**

1. PB- on , L1 on L2 on;

| PB | L1 | L2 |
|---|---|---|
| 0 | 0 | 0 |
| 1 | 1 | 0 |
| 0 | 1 | 1 |

2.

| PB | L1 | L2 | L3 |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 1 | 1 | 0 | 0 |
| 0 | 1 | 1 | 0 |
| 1 | 1 | 1 | 1 |

**Memory**

**Exercises.**

**1.**

| PB | L1 |
|---|---|
| 0 | 0 |
| 1 | 1 |
| 0 | 1 |
| 1 | 0 |

**2.**

| PB | L1 |
|---|---|
| 0 | 0 |
| 1 | 0 |
| 0 | 0 |
| 1 | 1 |

**FPwinpro-**

**More Exercises**

1. S1&S2 on L1-on
   S3 or S4 on L2 on L1 off
2. S1 & S2 On - L1 ON
   S3 or S4 On – L2 On L1 Off
   S5 On – L1 ON L3 ON
3.

| PB | L1 |
|---|---|
| 0 | 0 |
| 1 | 1 |
| 0 | 1 |
| 1 | 1 |
| 0 | 0 |

4.

| PB | L1 |
|---|---|
| 0 | 0 |
| 1 | 1 |
| 0 | 1 |
| 1 | 1 |
| 0 | 1 |
| 1 | 0 |

**Timers and counters**

**Exercises.**

1. PB on , L1 on after 5 seconds.
2. PB- on , L1 On; 5 sec later L2 on ; 5 second later L3 on; 5 second later repeat process.

**Counters**

**Exercises**

1. 1 person enters the room – Light On.
   5 persons enter the room -fan ON.
   10 persons enter the room -AC ON Fan Off.
2. Job in sensor(JIS) & forward pushbutton (Fwd)ON- Forward motor motion
   Job out sensor(JOS) ON – motor Off.
   JOS and Reverse pushbutton (Rev) ON- Motor Reverse
   JIS ON - motor Off

**Exercises on PLC trainer kit**

1. SW1 ON- LED1 ON
   Sw1 off – LED 1 OFF
2. SW1 ON – LED 1 ON
   Sw1 ON again – LED 1 OFF
3. Sw1 ON – Buzzer ON
   Sw 2 ON – Buzzer OFF ( mute switch)

Sw2 Off – Buzzer ON

4. Sw2 Off – Buzzer ON
   Sw2 Off Again – Buzzer OFF
5. Switch on the Buzzer After a delay of 10 seconds of swiotching on SW1.
6. PB ON- Buzzer ON after 5 seconds Buzzer OFF after 10 Seconds.
7. Buzzer should beep 5 times after SW1 ON. Beep is 1 seconds buzzer ON and 1 second Buzzer OFF.
8. Sw1 ON – Beep Once
   Sw1 ON second time- Beep Twice
   Sw1 ON third time- Beep thrice
   Sw1 ON forth time- Beep once
   Sw1 ON fifth time- Beep Twice
9. Sw1 ON  Beep thrice
   Sw1 ON second time- Beep Twice
   Sw1 ON third time- Beep once
   Sw1 ON forth time- Beep thrice
10. Decreasing series
11. Speed control of DC motor
12. Use relay to control motor
13. Use limit switch to control LED. NC- LED NO- Buzzer
14. Make a stepper motor rotate by angle of 270 degrees