**Scheme – G**

# Sample Test Paper - I

**Course Name : Diploma in Instrumentation / Instrumentation Control / Industrial Electronics**

**Course Code : IS/IE/IC/IU**

**Semester : Sixth for IS/IC/IE and Seventh for IU** **17664**

**Subject Title : Industrial Automation**

**Marks : 25** **Time : 1 Hrs.**

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**Instructions:**

1. All questions are compulsory.
2. Illustrate your answers with neat sketches wherever necessary.
3. Figures to the right indicate full marks.
4. Assume suitable data if necessary.
5. Preferably, write the answers in sequential order.

**Q1. Attempt any THREE of the following** **09 Marks**

a) State any three needs of automation.

b) Name any six different tools for automation.

c) Draw the labeled block diagram of PLC.

d) Illustrate the concept of sinking type of DC input module.



**Q2) Attempt any TWO of the following:** **08 Marks**

a) Name any four analog input devices and digital output devices with respect to PLC.

b) Draw wiring diagram for input device that measures pressure and gives discrete output in PLC.

c) State the following with respect to PLC

i) Program files. ii) Data files

**Q3) Attempt any TWO of the following:** **08 Marks**

a) State the concept of redundancy in PLC.

b) Illustrate how output addressing is done in PLC

c) Draw the block diagram DC input module.

**Scheme – G**

# Sample Test Paper - II

**Course Name : Diploma in Instrumentation / Instrumentation Control / Industrial Electronics**

**Course Code : IS/IE/IC/IU**

**Semester : Sixth for IS/IC/IE and Seventh for IU** **17664**

**Subject Title : Industrial Automation**

**Marks : 25** **Time : 1 Hrs.**

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**Instructions:**

1. All questions are compulsory.
2. Illustrate your answers with neat sketches wherever necessary.
3. Figures to the right indicate full marks.
4. Assume suitable data if necessary.
5. Preferably, write the answers in sequential order.

**Q1. Attempt any THREE** **09 Marks**

a) Draw the symbols of following instructions.
   i) NO ii) Latch iii) OSR

b) List any three programming languages of PLC.

c) State any three precautions while placing PLC inside in an enclosure.

d) Draw ladder diagram of AND gate and OR gate.



**Q2) Attempt any Two of the following:** **08 Marks**

a) 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.

b) Draw timing diagram of TON timer showing status of DN bit and TT bit.

c) Write ladder program for 4:1 demultiplexer.

**Q3) Attempt any Two of the following:** **08 Marks**

a) Write general format of PID instruction with respect to PLC

b) Write the steps to detect faults for LED status of I/O module.

c) Write a ladder program for blinking of LED with delay of 1 sec.

**Scheme – G**

# Sample Question Paper

**Course Name : Diploma in Instrumentation / Instrumentation Control / Industrial Electronics**

**Course Code : IS/IE/IC/IU**

**Semester : Sixth for IS/IC/IE and Seventh for IU** **17664**

**Subject Title : Industrial Automation**

**Marks : 100** **Time : 3 Hrs.**

**Instructions:**

1. All questions are compulsory.
2. Illustrate your answers with neat sketches wherever necessary.
3. Figures to the right indicate full marks.
4. Assume suitable data if necessary.
5. Preferably, write the answers in sequential order.

**Q1.A) Attempt any THREE.** **Marks 12**

a) List any four needs of automation.

b) Draw labeled diagram of DC input module. Write the operation of isolation of optical isolator.

c) If Input the addressing of PLC is I1: 2.0/3, What does I,1,2,0,3 indicate?

d) 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



**Q1.B) Attempt any ONE.**

a) i) Differentiate relay control and PLC control on the basis of complexity of hardware and speed. **Marks 02**
ii) Draw block diagram of PLC. Explain the function of CPU. **Marks 04**

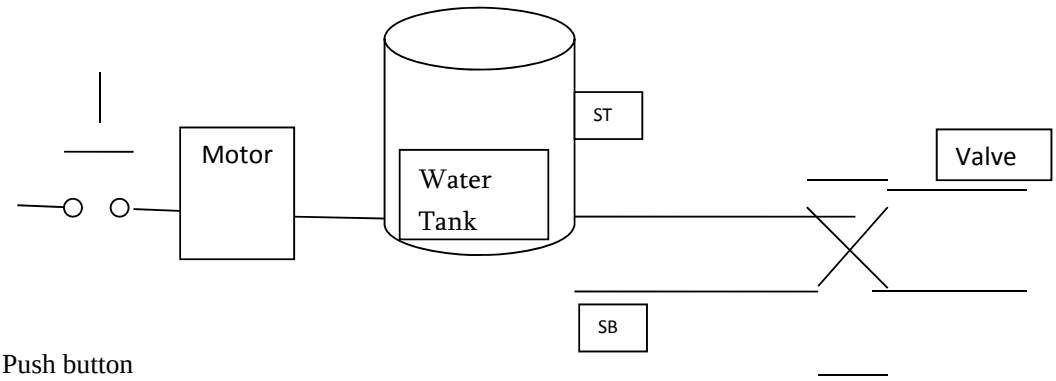
b) Draw block diagram of analog input module .State the function of each block. **Marks 06**

**Q2. Attempt any TWO.**

a) i) Name different PLC languages. **Marks 02**
ii) Write general format of PID instruction with respect to PLC. **Marks 06**

b) Draw a ladder diagram for 2 motor operations for following conditions. **Marks 08**
i) Start push button starts motor M1 and motor M2.
ii) Stop push button stops motor M1 first then after 10 sec. motor M2.

c) Write a ladder program for following conditions. Refer figure below. **Marks 08**



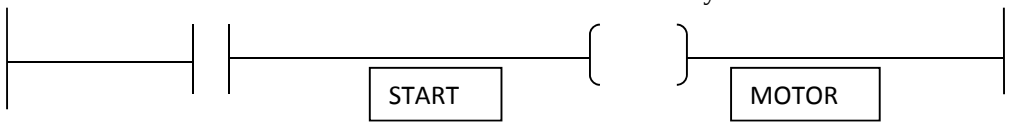

Push button

**ST - TOP Level sensor.** **SB - Bottom level sensor.**

i) When a push button is pressed motor will start; Water level in the tank start to rise.
ii) When SB is activated and ST is not activated, motor is on.
iii) When ST is activated, motor becomes off and valve is opened.

**Q3. Attempt any FOUR.** **Marks 16**

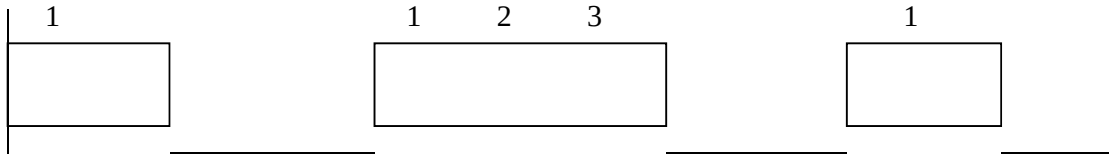
a) State the following with respect to PLC
   i) System Memory ii) Application memory
b) Write the abbreviation of the following automation tools.
   i) SCADA ii) DCS iii) PLC iv) CNC
c) Draw sinking type and sourcing type DC input module, Why are they called so?
d) If the start button is a push button, if it is pressed motor becomes on. Even though it is released motor should be on. Which instruction is to be used and why?




e) State four precautions when placing PLC in an enclosure.

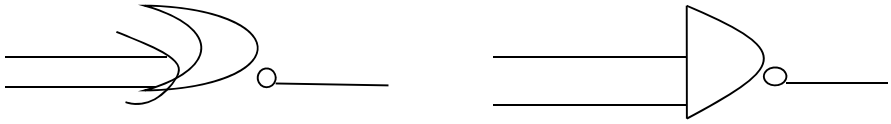
**Q4.A) Attempt any THREE.** **Marks 12**

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




b) State the concept of redundancy with.resptct.
c) Draw electrical and ladder diagram for the following logic gates.

i)



d) Why grounding is necessary for PLC during installation?

**Q4.B) Attempt any ONE.** **Marks 06**

**a.** Classify the following devices in to input and output devices with respect to PLC.

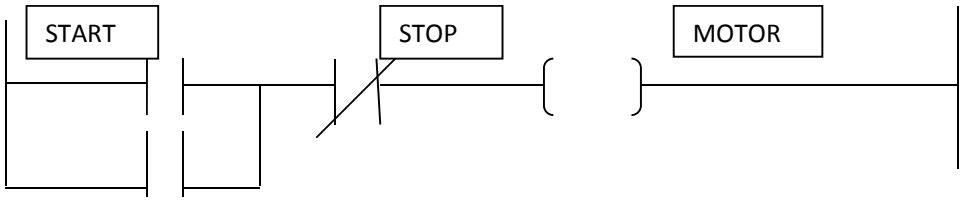
Pressure switch, Thermocouple, Motor, Push Button, Solenoid Valve, toggle Switch, Stepper Motor, Level Switch, Lamp, RTD, LED, Sensor

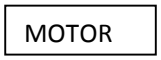
**b.** Draw DC output module, state the function of each block.

**Q5. Attempt any TWO.** **Marks 16**

a) Draw the block diagram of analog output module and state the function of each block.

b) i) If ladder diagram is




Write its structured text program.



ii) Write a ladder program for blinking of a LED.

c) Write a ladder program for following conditions.
   i) When start button is pressed, motor M1 is started
   ii) After 5 sec motor M1 stops and motor M2 starts.
   ii) After 5 sec motor M2 stops and motor M3 starts.
   iv) When stop button is pressed motor M3 stops.

**Q6. Attempt any FOUR.** **Marks 16**

a) Draw block diagram of 4 wire RTD input module.

b) Write a ladder program to measure frequency using timer and counter instruction.

c) During PLC installation, how noise suppression is done.

d) Write Ladder program for
   i) if A= B Led becomes on
   ii) if A≤ B Led becomes off

e) Illustrate fault detection technique for led status of input and output module.