

Scheme – I
Sample Question Paper

Program Name : Industrial Electronics
Program Code : IE.
Semester : SIXTH
Course Title : PLC and SCADA
Marks : 70

22640

Time: 3Hrs.

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.

Q.1) Attempt any FIVE of the following: -

(10 Marks)

- (a) State needs of Automation (Two points).
- (b) Draw memory organization of PLC.
- (c) Draw relay type output module.
- (d) List any four PLC programming languages.
- (e) Draw PLC I/O addressing.
- (f) List any four benefits of SCADA.
- (g) Define w.r.t. to SCADA: i) Tags ii) Items.

Q.2) Attempt any THREE of the following :-

(12 Marks)

- (a) Explain the term redundancy with respect to PLC.
- (b) Explain sinking and sourcing concept w. r. t. DC input module.
- (c) Write a ladder program for AND gate. Draw its truth table.
- (d) Elaborate the role of “an OPC” in SCADA-PLC interfacing.

Q.3) Attempt any THREE of the following.

(12 Marks)

- (a) Draw the block diagram of analog output module. Explain each block.
- (b) With neat timing diagram explain on delay timer instruction.
- (c) Draw the ladder diagram for the following Boolean equations.

$$Y1=A+B+C\bar{D}E, Y2 =F \ominus G, Y3=Y1+Y2, Y4= Y1.Y2$$

- (d) Describe the steps involved in interfacing of PLC based application to a SCADA system.

Q.4) Attempt any THREE of the following.

(12 Marks)

- (a) Draw the block diagram of PLC and explain the function of CPU.
- (b) Explain any four I/O selection criteria.
- (c) Explain status bits CD, DN and OV of the counter. Draw the first word of counter memory that stores these status bits.
- (d) Draw block diagram of SCADA. Explain each block in brief.
- (e) Develop Level control system application in SCADA. List the tags to be interlinked with PLC.

Q.5) Attempt any TWO of the following.

(12 Marks)

- (a) Draw the block diagram of AC input module and explain the function of each block.
- (b) System startups include three motors in a sequence with a delay of 5 sec between each start up i.e a motor-2 start after 5 sec of motor-1 and motor-3 starts at delay of 5 sec w.r.t motor-2. During shut down motor-3 shuts first and motor-2 after 5 sec of motor-3 and motor-1 shut after 5 sec of motor-2. Develop ladder programming.
- (c) Describe the steps involve developing SCADA application with any simple system.

Q.6) Attempt any TWO of the following.

(12 Marks)

- (a) Draw logic diagram and PLC ladder diagram for 4: 1 multiplexer. Write its truth table.
- (b) Draw a ladder diagram for stepper motor control.
- (c) Differentiate between SCADA and PLC.

Scheme – I
Sample Test Paper - I

Program Name : Industrial Electronics
Program Code : IE
Semester : SIXTH
Course Title : PLC and SCADA
Marks : 20

22640

Time:1 Hour

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.

Q.1 Attempt any FOUR.

(08 Marks)

- a) Name any four different tools for automation.
- b) Define Automation.
- c) Draw a neat labeled diagram of an AC output module
- d) Give specifications of AC input module (any 2).
- e) Classify PLC.
- f) State the need of automation.

Q.2 Attempt any THREE.

(12 Marks)

- a) Draw the block diagram of power supply in PLC. Explain each block.
- b) List any four I/O module selection criteria.
- c) Explain the sinking & sourcing concept in PLC output module.
- d) Draw the block diagram of analog input module. Explain each block.
- e) Draw the block diagram of DC input module. Explain each block.

Scheme – I
Sample Test Paper - II

Program Name : Industrial Electronics
Program Code : IE.
Semester : SIXTH
Course Title : PLC and SCADA
Marks : 20

22640

Time:1 Hour

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.

Q.1 Attempt any FOUR.

(08 Marks)

- a) Draw the ladder diagram to verify the truth table of NAND gate.
- b) Draw a symbol of ON delay timer instruction.
- c) Define w. r. t. SCADA: i) Tags, ii) Items.
- d) List benefits of SCADA.
- e) Differentiate between RTU and MTU on any two points.
- f) Elaborate the term “an OPC”

Q.2 Attempt any THREE.

(12Marks)

- a) Two pulser start at the same time. Pulse J is pulse for 2 sec at every 12 sec. Output K is to pulse for 2 sec at every 4 sec. Draw ladder.
- b) Draw basic architecture of SCADA and explain it in brief.
- c) Draw the following instructions of PLC i) HSC ii) SCP. Explain it.
- d) A coal handling plant has three coal conveyors C1, C2, C3. C1 is fed from the output of crusher, C2 is mid-belt and C3 is pushed coal to the bunker. Design ladder for following requirement – i) C1 & C2 will be ON only when C3 is ON. ii) C1 will be ON when C2 & C3 are ON. iii) C1 & C2 trips when C3 trips. iv) C1 trips when C2 trips but C3 is ON. v) C1 trips when C2 & C3 trips.
- e) Write ladder logic for control of stepper motor.