Scheme - I

Sample Question Paper

Program Name : **Electrical Engineering Program Group**
Program Code : **EE/EP/EU**
Semester : **Fifth**
Course Title : **Elements of Industrial Automation (Elective)**
Max. Marks : **70** **Time: 3 Hrs.**

22526

Instructions:
(1) All questions are compulsory.
(2) Illustrate your answers with neat sketches wherever necessary.
(3) Figures to the right indicate full marks.
(4) Sub-questions in a main question carry equal marks.
(5) Assume suitable data if necessary.
(6) Preferably, write the answers in sequential order.

Q.1 Attempt any Five of the following. **10 Marks**

a) Draw the symbols of following components used in industrial control circuits.
i) Fuse ii) Over load relay iii) Earthing iv) 3 Φ Induction Motor

b) State the functions of PID controller module and communication module.

c) List any two input and output devices used in conjunction with PLC

d) Draw the symbols of following relay type instructions. i) IF-OPEN ii) IF -CLOSE

e) State any two uses of HMI.

f) State the function of seal in circuit w.r.t. PLC.

g) Draw the ladder program for verifying the XOR logic.

Q.2 Attempt any Three of the following. **12 Marks**

a) Develop the control circuit for star-delta starter used for starting a 3 Φ Induction Motor.

b) State the functions of following components in PLC i) Input module ii) CPU

c) Draw a ladder diagram for 3 motor operation for following condition:
i) Start push button starts motor M_1. After 15 seconds M_2 and M_3 starts
ii) Stop push button stops M_3 and after 15 seconds motor M_2 and M_1

d) Develop the ladder diagram for ON/OFF temperature controller.

Q.3) Attempt any Three of the following. **12 Marks**

a) Explain the instruction T_{ON} and T_{OFF}.

b) Explain block diagram of SCADA .Identify different components of it.

c) Develop the ladder program for Forward – Reverse control of a 3 Φ Induction Motor.

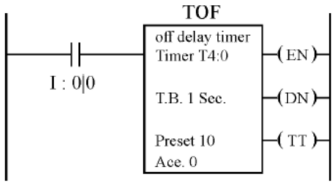
d) Draw the timing diagram for following timer instruction bit.

i) I:0/0

ii) EN

iii) DN

iv) TT



Q.4) Attempt any Three of the following. 12 Marks

a) Develop a ladder and wiring diagram of DOL starter with OLR.

b) Identify the criterion for comparing the given PLCs for particular application.

c) Explain with block diagram the working of soft starter.

d) Explain the working of FWD-STOP-REV control circuit of an Induction motor.

e) Draw the block diagram of digital input module of PLC. State function of its blocks.

Q.5) Attempt any Two of the following. 12 Marks

a) Develop a generalized DCS architecture for control of a plant.

b) Explain the working of PLC based Traffic light control with the help of ladder diagram.

c) Develop a control and power circuit for conveyer.

Q.6) Attempt any Two of the following. 12 Marks

a) Develop the ladder program for bottle filling application.

b) Explain the block diagram and function of each part in PID controller module.

c) i) Develop a ladder program explaining the use of Latching Relay.

ii) Explain the ladder program of water level controller

Scheme - I

Sample Test Paper - I

Program Name : **Electrical Engineering Program Group**

Program Code : **EE/EP/EU**

Semester : **Fifth**

22526

Course Title : **Elements of Industrial Automation (Elective)**

Max. Marks : **20** **Time: 1 Hour**

Instructions:

(1) All questions are compulsory.
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Q.1 Attempt any FOUR. **08 Marks**

a. State the need of Automation.

b. State the functions of proximity switch and pressure switch.

c. State the function of soft starter.

d. Draw the symbol of MCB and DC motor.

e. Differentiate between modular and fixed PLC.

f. State the function of stepper motor module in PLC.

Q.2 Attempt any THREE. **12 Marks**

a. Develop control and power circuit for lifting magnet.

b. Develop control and power circuit for mill extruder.

c. Compare micro and mini PLCs based on CPU type, no. of I/Os, speed and memory.

d. Identify the components of Analog output module. State the functions of any four of them.

e. Explain the functions of various components of the block diagram of PLC

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Scheme - I

Sample Test Paper - II

Program Name : **Electrical Engineering Program Group**

Program Code : **EE/EP/EU**

Semester : **Fifth**

22526

Course Title : **Elements of Industrial Automation (Elective)**

Max. Marks : **20** **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) Sub-questions in a main question carry equal marks.
(5) Assume suitable data if necessary.
(6) Preferably, write the answers in sequential order.

Q.1 Attempt any FOUR. **08 Marks**

a. State the components of Ladder diagram.

b. Draw a PLC wiring diagram for control of a lamp from 2 switches.

c. State the I/O list for bottle filling application.

d. State the function of RTU and MTU w.r.t. SCADA.

e. State any four features of DCS.

f. Draw the off delay timer instruction with waveforms.

Q.2 Attempt any THREE. **12 Marks**

a. Develop forward reverse control of 3 Φ IM using PLC.

b. With reference to Ladder logic, draw the symbols of following instructions:

(i) NO

(ii) OSR

(iii) Output coil

(iv) NC.

c. List arithmetic instructions of PLC. Explain any one instruction with example.

d. Draw ladder diagram for given truth tables

A	B	y
0	0	1
0	1	0
1	0	0
1	1	0

A	B	y
0	0	1
0	1	0
1	0	0
1	1	1

e. Explain CTD instruction with waveforms.
