

B.TECH
(SEM V) THEORY EXAMINATION 2022-23
INDUSTRIAL AUTOMATION & CONTROL

Time: 3 Hours**Total Marks: 100****Note:** Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt all questions in brief. 2 x 10 = 20

- a. What are the types of industrial automation?
- b. Give the advantages of PLC.
- c. What are the types of relay in automation system?
- d. What is relay ladder logic in PLC?
- e. What is sink type and source type in PLC?
- f. What does a Retentive timer mean?
- g. Give the application of inductive sensor.
- h. Write the advantages of industrial sensors.
- i. Explain Charles Law Boyle's law?
- j. Define relative and absolute humidity?

SECTION B

2. Attempt any three of the following: 10 x 3 = 30

- a. Give the introduction about modbus. Explain its working and the application.
- b. Discuss in detail about the types of relay. How relay work as memory element?
- c. Draw the Electrical Circuit along with ladder logic of AND, NAND, NOR, XOR, OR gates.
- d. Briefly explain about the Communication Modes of HART protocol and its advantage.
- e. What is pneumatic system? Explain the role of pneumatic system in industry.

SECTION C

3. Attempt any one part of the following: 10 x 1 = 10

- a. Discuss in detail about the Architecture of Industrial Automation system.
- b. What are Industrial communication protocols? Discuss about the Profibus.

4. Attempt any one part of the following: 10 x 1 = 10

- a. Explain the operation principle of a thermal overload relay and the role of its electric contacts.
- b. Explain the types of programmable logic controller and Difference between Relay and PLC.

5. Attempt any *one* part of the following: 10 x 1 = 10
- a. Discuss in detail about the on-delay and off-delay timer instruction in PLC.
 - b. Explain briefly about the up and down counter in PLC programming.
6. Attempt any *one* part of the following: 10 x 1 = 10
- a. What is HART Protocol in PLC? Explain briefly about the Point-to-Point Network Mode
 - b. What is interfacing sensor in PLC? Explain the working of NPN proximity sensor.
7. Attempt any *one* part of the following: 10 x 1 = 10
- a. Explain in about the Actuators, types of actuators, advantages and its application in industry
 - b. Write the short notes on :-
 - (i) Humidity and its types
 - (ii) ADP and PDP
 - (iii) 2/2 & 3/2 Valves