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BTECH
(SEM V) THEORY EXAMINATION 2024-25
INDUSTRIAL AUTOMATION AND CONTROL

TIME: 3 HRS**M.MARKS: 100****Note:** Attempt all Sections. In case of any missing data; choose suitably.**SECTION A****1. Attempt all questions in brief. 2 x 10 = 20**

Q no.	Question	CO	Level
a.	Discuss the role of a 4-20 mA current loop in industrial automation.	1	K2
b.	Name any two industrial communication protocols.	1	K1
c.	Discuss the primary purpose of SCADA in industrial automation.	2	K2
d.	Name the basic components of a contactor circuit.	2	K1
e.	State one advantage of contactors over relays.	3	K1
f.	Define a ladder diagram in PLC programming.	3	K1
g.	Differentiate between an on-delay and off-delay timer.	4	K2
h.	State one application of up/down counters in industrial automation.	4	K1
i.	Discuss the two modes of the HART protocol.	5	K2
j.	Differentiate between absolute humidity and relative humidity.	5	K2

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

a.	Explain the architecture of an industrial automation system with a neat diagram.	1	K2
b.	Describe the classification of PLCs and their applications in modern industries.	2	K1
c.	Illustrate Bernoulli's principle mathematically.	3	K4
d.	Explain each of the following PLC modes of operations (a) Program (b) Test and (c) Run	4	K2
e.	Discuss the working principles of pneumatic actuators and valves, including their applications.	5	K2

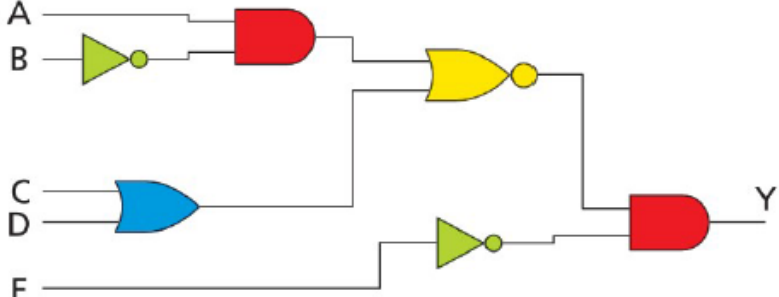
SECTION C**3. Attempt any one part of the following: 10 x 1 = 10**

a.	Illustrate the architecture of SCADA with a suitable diagram.	1	K4
b.	Illustrate the architecture of PLC with a suitable diagram.	1	K4

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

a.	Explain the construction and working principles of a relay circuit with suitable examples.	2	K2
b.	Discuss the implementation of a DOL starter using contactors with a detailed circuit diagram.	2	K2

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

a.	Explain a ladder logic for the following condition: 	3	K2
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Subject Code: KEE053

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b.	Explain a detailed explanation of ladder diagrams and sequential flowcharts.	3	K2
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6. Attempt any *one* part of the following: 10 x 1 = 10

a.	Explain the working principles and applications of optical, inductive, and capacitive sensors in industrial automation.	4	K4
b.	Explain the HART protocol, its modes, and its applications in industrial sensor communication systems.	4	K4

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

a.	Explain the basic components of a pneumatic system with a labeled diagram.	5	K4
b.	Explain the working principles of single-acting and double-acting actuators.	5	K4

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