Total No. of Questions: 6 *Total No. of Printed Pages:3*

Enrollment No.....

Faculty of Engineering
End Sem Examination Dec-2023
RA3EL09 Industrial Automation

Programme: B.Tech. Branch/Specialisation: RA

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

Q.1 i. An automation system is related to _____. **1**
(a) Distributed control system
(b) Supervisory control and data acquisition system
(c) Distinct control system
(d) Both (a) and (b)

ii. The machining transfer lines found in the automotive industry, automatic assembly machines, and certain chemical processes are examples of **1**
(a) Fixed automation (b) Flexible automation
(c) Programmable automation (d) Integrated automation

iii. Which type of system suitable in application like the food industry, petrochemical, and industrial involves robotics? **1**
(a) Pneumatic control system (b) Hydraulic control system
(c) Electrical control system (d) None of these

iv. The pneumatic system used in automation requires- **1**
(a) Compressed air supply
(b) Control valve & connecting tube
(c) Transducer
(d) All of these

v. Sensor effectiveness depends on _____ parameter. **1**
(a) Sensitivity (b) Radiation (c) Restively (d) All of these

vi. LDR sensor is abbreviated as _____. **1**
(a) Light Dependent Resistor (b) Light Determinant Resistor
(c) Luminous Duplicated Resistor (d) None of these

vii. Micro-Electro-Mechanical Systems (MEMS) consists of _____. **1**
(a) Microelectronic elements
(b) Actuators, sensors
(c) Mechanical structures
(d) All of these

viii. Micro-Electro-Mechanical Systems (MEMS) developed using _____ techniques. **1**
(a) Fabrication (b) Microfabrication
(c) Etching (d) None of these

ix. PLC operates on the following signals- **1**
(a) Digital (b) Impulse
(c) Analog (d) Frequency

x. In PLC operation _____ retrieves the data into an output module. **1**
(a) Input scan (b) Output scan
(c) Program scan (d) None of these

Q.2 i. Define the term automation. **2**
ii. Discuss briefly about Industry 4.0. **3**
iii. Explain the role of robotics in industrial automation. **5**
OR iv. Explain the fixed automation with advantages and disadvantages. **5**

Q.3 i. Define Pascal's law and list out the few applications of Pascal's law in fluid power system. **2**
ii. Draw a neat block diagram of hydraulic system and explain the functions of each component of hydraulic system. **8**
OR iii. Explain the various types of hydraulic fluids and their properties. **8**

Q.4 i. Briefly discuss the role of sensors in industrial automation. **3**
ii. Discuss the Electro-Pneumatic systems in detailed manner with logic control circuits. **7**
OR iii. Explain proximity sensor with neat sketch. **7**

Q.5 i. Discuss the role of piezoelectric materials in sensors. **4**
ii. Explain the Micro-Electro-Mechanical Systems (MEMS) with neat sketch. **6**
OR iii. Explain the thermal sensor and actuation with neat sketch. **6**

Q.6 Attempt any two:
i. Briefly discuss about the Evolution of PLC. **5**
ii. Explain the architecture of PLC with neat sketch. **5**
iii. Interpret the PLC ladder logic and ladder diagram. **5**

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