

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)**

**CLASS: M. TECH
BRANCH: ECE**

**SEMESTER: II
SESSION: SP/2023**

SUBJECT: EC561 APPLIED INDUSTRIAL INSTRUMENTATION

TIME: 3 Hours

FULL MARKS: 50

INSTRUCTIONS:

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
 2. Attempt all questions.
 3. The missing data, if any, may be assumed suitably.
 4. Before attempting the question paper, be sure that you have got the correct question paper.
 5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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|--------|--|---------|---------------|
| Q.1(a) | Enumerate main elements of a digital data acquisition system. Also, explain its necessity. | [5] CO1 | Knowledge |
| Q.1(b) | Why are current loops in the range of 4 to 20mA used for signal transmission in industry?
A Data Acquisition System has 8 input channels to be sampled continuously and sequentially. The multiplexer can select and settle on a channel in 5 μ s, the ADC converts in 40 μ s and the computer processes a single channel of data in 450 μ s. What is the minimum time between samples of a particular channel? | [5] CO1 | Understanding |
| Q.2(a) | Define supervisory control, its functions and communication configurations of SCADA. | [5] CO2 | Knowledge |
| Q.2(b) | What is Direct Digital Control (DDC)? Explain the working of DDC with its block diagram. | [5] CO2 | Understanding |
| Q.3(a) | Discuss the different elements of Final control operation? Discuss Current (I) to pressure (P) converter with the help of a diagram. | [5] CO2 | Understanding |
| Q.3(b) | Construct the physical ladder diagram for a motor with the following: NO START button, NC STOP button, thermal overload limit switch opens on high temperature, green light when running and red light for thermal overload. | [5] CO3 | Applying |
| Q.4(a) | What is VI in LabVIEW? What are the different components of a VI? Also, explain the different types of Vis. | [5] CO4 | Understanding |
| Q.4(b) | Compare graphical programming with conventional programming. Create a virtual instrument (VI) using LabVIEW to observe the Lissajous figure in the form of a Circle. | [5] CO4 | Applying |
| Q.5(a) | Enumerate the application of a fuzzy controller in plant control with the help of a block diagram. | [5] | Knowledge |
| Q.5(b) | Describe the following protocols with their applications in process industry
(a) IEEE-488 General Purpose Instrument Bus (GPIB),
(b) HART communication protocol | [5] | Understanding |

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