23MTOE312

# MANGALORE INSTITUTE OF TECHNOLOGY & ENGINEERING

(A Unit of Rajalaxmi Education Trust®, Mangalore)
Autonomous Institute affiliated to VTU, Belagavi, Approved by AICTE, New Delhi
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## Model Question Paper

## Fifth Semester BE Degree Examination

## Virtual Instrumentation

**Time: 3 Hours(180 Minutes)** **Max. Marks: 100**

***Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.***
***2. M: Marks, L: RBT (Revised Bloom's Taxonomy) level, C: Course outcomes.***

| | | Module -1 | M | L | C |
|---|---|---|---|---|---|
| Q1 | a. | Explain the working architecture of Virtual Instrumentation (VI) with a block diagram. | 10 | L2 | CO1 |
| | b. | Illustrate the various Data Flow Techniques and their key characteristics. | 10 | L2 | CO1 |
| | | **OR** | | | |
| Q2 | a. | Explain the main components of a PC-based Data Acquisition (DAQ) system with a labeled diagram. | 10 | L2 | CO1 |
| | b. | Differentiate between graphical programming and textual programming, by giving examples each. | 10 | L2 | CO1 |
| | | **Module- 2** | | | |
| Q3 | a. | Explain Sampling, Sampling Frequency, and Resolution in ADC and describe the role of a Data Acquisition Card. | 10 | L2 | CO2 |
| | b. | Illustrate the working principle of a Digital to Analog Converter with an example. | 10 | L2 | CO2 |
| | | **OR** | | | |
| Q4 | a. | Explain Digital Input/Output (I/O) works in a data acquisition system and describe the calibration process with the help of a neat, labeled sketch. | 10 | L2 | CO2 |
| | b. | Illustrate the different I/O techniques used in DAQ systems with a flow chart. | 10 | L2 | CO2 |
| | | **Module - 3** | | | |
| Q5 | a. | Apply modular programming techniques in LabVIEW to develop a user-defined function using sub–VIs. | 10 | L3 | CO3 |
| | b. | Illustrate different types Structure. Construct a VI using a Case Structure to execute different operations based on user selection. | 10 | L3 | CO3 |
| | | **OR** | | | |
| Q6 | a. | Develop a VI that uses loops to compute and display the sum and average of the first N natural numbers. | 10 | L3 | CO3 |
| | b. | Develop a VI to create and manipulate arrays, and explain the array functions used for data handling. | 10 | L3 | CO3 |
| | | **Module – 4** | | | |
| Q7 | a. | Apply RS-232 communication protocol to interface a PC with an external instrument. With XTAL=11.0592MHz, find the value needed to have following baud rate. i)9600 ii)4800 iii)2400 | 10 | L3 | CO4 |
| | b. | Apply the OSI/ISO model to a real-time serial bus communication scenario and explain the mapping of its layers with a diagram. | 10 | L3 | CO4 |
| | | **OR** | | | |
| Q8 | a. | Explain IEEE 488/GPIB architecture supports parallel communication with a neat sketch, and apply this to a scenario involving multiple instrument control. | 10 | L3 | CO4 |

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| | b. | Explain the architecture of MODBUS with a neat sketch and apply its functionality to a real-time data acquisition system. | 10 | L3 | CO4 |
| **Module – 5** | | | | | |
| Q9 | a. | Apply the concept of PID control to design a feedback control system with a block diagram and explain its role in maintaining system stability. | 10 | L3 | CO5 |
| | b. | Develop a VI to simulate a second order control system using LabVIEW software. | 10 | L3 | CO5 |
| **OR** | | | | | |
| Q10 | a. | Develop a basic ON/OFF temperature control system and explain its operation with reference to the indicators and controls present on a joint panel. | 10 | L3 | CO5 |
| | b. | Apply LabVIEW programming techniques to build a VI that generates an HTML page. | 10 | L3 | CO5 |

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