53 (IE 810) VTIS

2013

(May)

VIRTUAL INSTRUMENTATION

(Theory)

Paper : IE 810

Full Marks : 100

Pass Marks : 30

Time : Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions out of **seven**.*

1. *(a)* What is virtual instrument and why do we need it ? 5

   (b) Explain the concept of virtual instrument with the help of its architecture. 10

   (c) Explain how data Acquisition is done in LabVIEW. 5

2. *(a)* A 10 bit A/D converter is capable of accepting an input voltage 0 to 5.12V. What is the digital output code if the input voltage is 2.4V ? 6

(b) State the Nyquist sampling theorem. What happens when a sinusoid signal is sampled above the Nyquist rate ? Below the Nyquist rate ? 7

(c) Suppose a wheel with 12 spokes is rotating at 1.5 revolutions per second. Will a camera frame rate of 24Hz cause aliasing ? 7

3. *(a)* Write the "For loop" flow chart and how it is represented in LabVIEW. 5

(b) Give the block diagram and front panel construction steps to find the factorial of a given number using "For Loop" with neat sketch. 10

(c) Write a program in LabVIEW to convert the $^{\circ}C$ reading in $^{\circ}F$ reading for the measurement of temperature. 5

4. Draw the LabVIEW block diagram & front panel to simulate the level measurement process having the proportional controller equation as — $y = k(u - u_0)$

where, y = level of the tank

u = Measurement signal

u_0 = Set point

k = Gain

How the measurable data can be written into the computer and read from the computer using TDMS format, discuss with neat sketch. 20

5. *(a)* Write the basic features of Rs. 232 (DB9 pin out) interface. 5

(b) What is USB ? Write the USB functions with neat sketches. 10

(c) Write notes on Rs. 422. 5

6. *(a)* What is SUB VI ? How it is generated in LabVIEW ? Explain this by solving the quadratic equation, $ax^2 + bx + c = 0$ 10

(b) Design a SubVI of a ON/OFF controller. 8

(c) Write the operation of shift register in LabVIEW. 2

7. Write short notes : ***(any four)*** 4×5

(a) Case structure in LabVIEW

(b) Auto-indexing array

(c) Formula nodes

(d) Quantization operation

(e) IEEE 488.2 bus.
