53 (IE 810) VTIS

2013

(December)

VIRTUAL INSTRUMENTATION

Full Marks : 100

Time : Three hours

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

*Answer **any 5** questions **out of** 7 questions.*

1. *(a)* Explain the concept of virtual instrument with the help of its architecture. 10

   (b) Define the terms : front panel and block diagram. 5

   (c) What is data Acquisition and how it is done in LABVIEW. 5

2. *(b)* Find the successive approximation ADC output for a 8 bit converter to a 6.217 *volt* input if the reference is 10 *volt.* 6

(b) State the Nyquist sampling theorem. What happens when a sinusoid signal is sampled above the Nyquist rate ? Below the Nyquist rate ? 8

(c) Consider the analog signal $x_a(t) = 3\cos 100\pi t$. Determine the minimum sampling rate required to avoid aliasing. Suppose that the signal is sampled at the rate of $F_s = 200Hz$, what is the discrete time signal obtained after sampling ? 6

3. *(a)* Write the "While Loop" flow chart and how it represented in Lab VIEW. 5

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

(c) Write a program in Lab VIEW to convert the $°C$ reading in $°F$ reading for the measurement of temperature. 5

4. *(a)* Draw the Lab VIEW 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)* What is USB ? Write the USB functions with neat sketches. 10

(b) Write notes on RS. 422. 5

(c) Write the basic features of RS 232 (DB 25 pin out) interface. 5

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

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

(c) What is meant by auto indexing ? 2

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

(a) Formula nodes

(b) IEEE 488.2 bus

(c) Polymorphism & clusters

(d) Shift Register

(e) For loop structure in Lab VIEW.
