53 (IE 810) VTIS

2018

VIRTUAL INSTRUMENTATION

Paper : IE 810

Full Marks : 100

Time : Three hours

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

Symbols have their usual significances.

*Answer **any five** questions.*

1. *(a)* What is Virtual Instrumentation ? What are the advantages of Virtual Instrumentation ? 6

   (b) Define sampling theorem and sample rate. 4

   (c) Draw and explain the dual slope type ADC *or* R-2R type 4-bit DAC. 10

2. (a) Write a VI program to convert degree to radian and radian to degree. 10

(b) What is Sub VI ? Explain how the Sub VI can be reused to solve a problem. 10

3. (a) Convert a 4-bit binary number to a 4-bit Gray code using VI program. 8

(b) A first order response is described by the equation $y(t)=(y_f-y_i)\left[1-e^{\frac{-t}{\tau}}\right]$ where y_i is initial value of y at $t=0$, y_f is final value of y at $t=$ infinite and τ is time constant. Mentioning the different steps, create a VI that will solve the value of y for a specified time. 12

4. (a) Explain the FOR Loop and WHILE Loop. Give *one* example for each case. 10

(b) Create a VI to find the sum of first 20 natural numbers using FOR Loop. 10

5. (a) What is Data Acquisition System (DAS) ? Draw and explain the computer based DAS. 10

(b) Explain how DAS can be designed and developed using Labview. Mention at *least four* important parameters that to are be set during VI program. 10

6. (a) What are the features of RS 485 and RS 422 ? 6

(b) Mention and explain the different buses. 6

(c) Explain in detail about the different USB standards. 8

7. (a) Explain how two-dimensional arrays can be generated in Labview. 10

(b) Write a VI program to simulate a PI controller. 10

8. Write short notes on ***any four*** of the following : 4×5=20

(a) Array and clusters

(b) cRIO and myRIO devices

(c) Weighted resistor type 4-bit DAC

(d) Role of range and resolution in DAS

(e) Shift register

(f) Feedback nodes.
