53 (IE 810) VRIN

2016

VIRTUAL INSTRUMENTATION

Paper : IE 810

Full Marks : 100

Time : Three hours

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

Answer ***any five*** *questions.*

1. *(a)* Explain the effects of sampling and aliasing due to under sampling and over sampling. 5

   (b) Explain the typical DAQ card and universal DAQ card. 5

   (c) Explain with neat diagram *any two* types of ADC. 10

2. *(a)* Explain with the block diagram construction steps to find the factorial of a given number using "For Loop" and "While loop". 10

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

3. *(a)* What is Sub VI? How the Sub VI is reused in the new VI? With the help of an example properly describe the operation. 5

(b) Using LabVIEW software convert a binary number to a decimal number. Give all the block diagram steps. 5

(c) Create a VI for satisfying the dynamic equation of a P-I-D controller. Write all the necessary steps. 10

4. *(a)* Define cluster? Create a VI to check whether the cluster elements are in the range or not. Specify the upper and lower limits. 1+4

(b) What is the maximum element size in a 32 bit computer of a LabVIEW program ? Create a two dimensional array in a LabVIEW program and explain how indexing is done using Index Array function. 1+4

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

5. (a) Draw the LabVIEW block diagram and front panel to simulate the level measurement process having the proportional controller equation —

$$y = k(u - b)$$

where,

y = level of the tank

u = set point

b = measured signal

k = controller gain

How the measurable data can be written into the computer read from the computer using "LVM" format ? Discuss with neat sketch. 20

6. *(a)* What are the types of waveforms available in LabVIEW ? Build a VI to plot a circle in the *XY* graph. 5

(b) What is sequence structure ? Design a VI to find square root of a given number using case structure. Give a message for negative number. 1+4

(c) What is a CAN bus ? List the advantages of CAN bus. 5

(d) List the specifications of RS-232. 5

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

(a) Global and Local variable

(b) Formula node and Shift registrar

(c) Auto-indexing array

(d) IEEE 488·2 bus

(e) RS-422