53 (IE 810) VTIS

2017

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 out of **seven**.*

1. (a) Define Virtual Instrumentation. State the advantage and disadvantage of Virtual Instrumentation. 2+3

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

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

2. (a) Explain Sampling theorem. Discuss Sample and Hold circuits with its neat diagram. 2+5

(b) Determine the output voltage caused by each bit in a 6 *bit* R-2R ladder DAC if the input levels are $0 = 0V$ and $1 = +16V$. Also determine the resolution and full scale output of the network.

8

(c) Define the MOD Bus and CAN Bus.

5

3. (a) Write a VI to perform simple arithmetic (addition, subtraction, multiplication and division) and Logical operations (AND, OR, XOR, and NOT). 5

(b) 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

(c) Build a VI which consists of numeric input array. Set a threshold value and separate the array elements which are greater than the threshold. Create an icon and connector and save this VI as Sub VI. Write all the necessary steps for block diagram. 10

4. (a) How the operation of a CRO is implemented in LabVIEW ? 5

(b) How the P-I-D controller is designed in LabVIEW ? Explain with step by step procedure. 10

(c) Write the "While Loop" and "For Loop" structure in LabVIEW platform.

5

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

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

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 and read from the computer using TDMS format ? Discuss with neat sketch. 10+10

6. (a) Explain the operation of 7-layer ISO-OSI model for Serial Communication. 10

(b) What is USB ? Write the USB functions. 5

(c) Compare the features of RS 232, RS 422 and RS 485. 5

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

(a) IEEE 488·2 bus

(b) Auto Indexing

(c) Local variable and Global variable

(d) Clusters in LabVIEW

(e) Formula Nodes and Shift Register

(f) Seven Segment display using LabVIEW.