Sr. No. 008504

December, 2023

B. Tech. (ECE)- V SEMESTER

Intelligent Instrumentation (OEL503)

Time: 3 Hours

Max. Marks:75

Instructions:
1. *It is compulsory to answer all the questions (1.5 marks each) of Part -A in short.*
2. *Answer any four questions from Part -B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART -A

Q1 (a) If the speed of I/O devices does not match the speed of the microprocessor, what type of data transfer techniques is used?? (1.5)

(b) Built a VI to find factorial of a number. (1.5)

(c) Built a VI to find the sum of array elements (1.5)

(d) What is the role of filters in signal analysis? (1.5)

(e) What is the fundamental principle behind optical fiber communication? (1.5)

(f) Explain the use of shift register in for loops and while loops. (1.5)

(g) What is curve fitting in probability and statistics? (1.5)

(h) Discuss the concept of linearity in the static characteristics of intelligent instrumentation. Why is linearity important, and how is it typically assessed? (1.5)

(i) What is the difference between GPIB and serial? (1.5)

(j) How do you calculate baud rate and bit rate? What is the bit rate of 115200 baud? (1.5)

PART -B

Q2 (a) How do static and dynamic characteristics complement each other in assessing the overall performance of intelligent instrumentation? Explain the importance of calibration in maintaining the static and dynamic performance of intelligent instruments. (10)

(b) Write a program in LabVIEW to convert a given decimal number to binary form. (5)

Q3 (a) Explain the bus diagram of RS232 in serial interfacing. (5)

(b) Draw the block diagram showing the basic functional elements of Intelligent Instrument and explain the functions of each block. (10)

Q4 Explain optical fiber communication system with the help of block diagram. Describe the role of optical cross-connects in managing and routing signals within an optical fiber network. (15)

Q5 (a) Built a VI to convert Celsius to Fahrenheit. (5)

(b) How can a microcontroller interface with external memory devices such as EEPROM or Flash memory? Discuss the necessary components and protocols. (10)

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Q6 (a) Discuss the use of clusters and arrays in building LabVIEW VI tools. Provide examples of situations where clusters or arrays might be beneficial. (5)

(b) Built a VI to find whether the given number is odd or even. (10)

Q7 Write short notes on: (15)

(i) Haar Wavelet Transform

(ii) Loops in VI

(iii) Network Topologies

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