**18EI603**

**Hall Ticket Number:**

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| **III/IV B. Tech (Regular) DEGREE EXAMINATION** | | | |
| **July, 2021** | **Electronics and Instrumentation Engineering** | | |
| **Sixth Semester** | **Digital Signal Processing** | | |
| **Time:** Three Hours | | **Maximum: 5**0 Marks | |
| *Answer Question No. 1 Compulsorily.* | | | (10X1 = 10 Marks) |
| *Answer* ***ANY ONE*** *question from each Unit.* | | | (4X10=40 Marks) |

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| 1. | a) | How discrete-time systems are classified? | CO1 | |  |
|  | b) | Write the expression for convolution sum of non-causal system exited by a non-causal input. | CO1 | |  |
|  | c) | What is the ROC of an infinite duration non-causal sequence? | CO1 | |  |
|  | d) | What is the DFT of the sequence? | CO2 | |  |
|  | e) | Draw the basic butterfly diagram of radix-2 DIT FFT ? | CO2 | |  |
|  | f) | If the DFT of x(n) is X(k)={4, -j2, 0, j2}. Find the DFT of ? | CO2 | |  |
|  | g) | What are the desirable characteristics of the window? | CO3 | |  |
|  | h) | State the condition for a digital filter to be stable and causal. | CO3 | |  |
|  | i) | What is frequency warping? | CO4 | |  |
|  | j) | What is the relationship between analog and digital frequencies in bilinear transformation? | CO4 | |  |
| **Unit - I** | | | | | |
| 2. | a) | Obtain the relation between DTFT and Z- Transform | CO1 | **4M** | |
|  | b) | Analyze and characterize LTI systems using Z-transform with an example. | CO1 | **6M** | |
|  |  | **(OR)** |  |  | |
| 3. | a) | Compute the Z-Transform and ROC of | CO1 | **6M** | |
|  | b) | State and prove convolution property in Z- transform. | CO1 | **4M** | |
| **Unit - II** | | | | | |
| 4. | a) | Using overlap add method, find out the output of a system for x(n) = {1, 2, -3, 2, -1, 0, 2, 1, -2, -1} and h(n) = {1, 1, 1}. Assume block length is 5. | CO2 | **6M** | |
|  | b) | State and prove the Parseval’s relation with respect to DFT | CO2 | **4M** | |
|  |  | **(OR)** |  |  | |
| 5. | a) | Find the 4-point DFT of the sequence x(n) = {2, -1,-2, 1}. | CO2 | **5M** | |
|  | b) | Find the circular convolution of the sequences x(n) = {1, –1, 1, –1} and h(n) = {1, 2, 3, 4} using DFT | CO2 | **5M** | |
| **Unit - III** | | | | | |
| 6. | a) | Write the steps involved in FIR filter design. | CO3 | **4M** | |
|  | b) | Discuss the frequency sampling method of FIR filter design. | CO3 | **6M** | |
|  |  | **(OR)** |  |  | |
| 7. | a) | Explain the procedure for designing FIR filters using windows. | CO3 | **4M** | |
|  | b) | Realize the system function of the FIR filter using cascade form. | CO3 | **6M** | |
| **P.T.O.**  **18EI603**  **Unit - IV** | | | | | |
| 8. | a) | Obtain the direct form-II structure for the system | CO4 | **6M** | |
|  | b) | What is frequency warping? How it can be eliminated in the design of IIR filters using Bi-linear transformation? 6M | CO4 | **4M** | |
|  |  | **(OR)** |  |  | |
| 9. | a) | Using the bilinear transformation, obtain H(z) from Ha(s) when T=1sec and . | CO4 | **4M** | |
|  | b) | Discuss the frequency transformation for analog filters. | CO4 | **6M** | |

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