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Code.No: **R05311101** | **R05** | **SET-1**

III B.TECH – I SEM EXAMINATIONS, NOVEMBER – 2010
DIGITAL SIGNAL PROCESSING
(COMMON TO BME, ECC)

Time: 3hours **Max.Marks:80**

Answer any FIVE questions
All questions carry equal marks

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1.a) Discuss in detail about various basic discrete time signals.
b) A discrete time system is represented by the difference equations in which x(n) is the input and y(n) is the output, given by y(n) = x(n+1)-3x(n)+x(n-1); $n \geq 0$ & y(n) = 0, $n < 0$.
Check whether the system defined above is linear, time invariant and causal or not. [8+8]

2.a) Define DFT and IDFT. Compute the DFT of the given time domain sequence x(n) = { 1,2,3,4,4,3,2,1}.
b) State and Prove Linearity, Time Invariant, Frequency shift and Time shift properties of DFT. [8+8]

3.a) Compute FFT of the given sequence x(n) = {8, 3, 5, 6, 7, 8, 4, 5} using Radix-2 DIT FFT Algorithm.
b) Compare the computational complexity of DFT and FFT. [8+8]

4.a) Define Z- Transform. Determine the impulse response for the system given by the difference equation y(n) = x(n)+3x(n-1)-4x(n-2)+2x(n-3).
b) Obtain the Parallel and Cascade form realization of the given LTI system governed by the difference equation
y(n) = - 3/8 Y(n-1) + 3/32 y(n-2) + 1/64 y(n-3) + x(n) + 3 x(n-1) + 2 x(n-2). [8+8]

5.a) Compare and Contrast Bilinear & Impulse Invariant transformation technique
b) Design a Digital Butterworth LPF using Bilinear transformation technique for the following specifications

$$0.707 \leq |H(w)| \leq 1 \quad ; 0 \leq w \leq 0.2\pi$$
$$|H(w)| \leq 0.08 \; ; 0.4\pi \leq w \leq \pi$$

[8+8]

6.a) Bring out the Comparison between FIR and IIR Filters.
b) Design an FIR Digital Low pass filter using Hamming window whose cutoff freq is 1.2 rad/s and length of window N=9. Assume necessary data [8+8]

7.a) What is the importance of Multirate Signal Processing and hence define Decimation and Interpolation.
b) Discuss the process of decimation with a neat block diagram and explain how the aliasing effect can be avoided. [8+8]

8.a) Discuss the internal architecture of a TMS 320C54xx Digital signal processor
b) Explain six stage pipeline architecture of TMS320C54xx processor. [8+8]

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Code.No: **R05311101** | R05 | SET-2

III B.TECH – I SEM EXAMINATIONS, NOVEMBER – 2010
DIGITAL SIGNAL PROCESSING
(COMMON TO BME, ECC)

Time: 3hours **Max.Marks:80**

Answer any FIVE questions
All questions carry equal marks

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1.a) Compute FFT of the given sequence x(n) = {8, 3, 5, 6, 7, 8, 4, 5} using Radix-2 DIT FFT Algorithm.
b) Compare the computational complexity of DFT and FFT. [8+8]

2.a) Define Z- Transform. Determine the impulse response for the system given by the difference equation y(n) = x(n)+3x(n-1)-4x(n-2)+2x(n-3).
b) Obtain the Parallel and Cascade form realization of the given LTI system governed by the difference equation
y(n) = - 3/8 Y(n-1) + 3/32 y(n-2) + 1/64 y(n-3) + x(n) + 3 x(n-1) + 2 x(n-2). [8+8]

3.a) Compare and Contrast Bilinear & Impulse Invariant transformation technique
b) Design a Digital Butterworth LPF using Bilinear transformation technique for the following specifications
$0.707 \leq |H(w)| \leq 1 \quad ; 0 \leq w \leq 0.2\pi$
$|H(w)| \leq 0.08 \; ; 0.4\pi \leq w \leq \pi$ [8+8]

4.a) Bring out the Comparison between FIR and IIR Filters.
b) Design an FIR Digital Low pass filter using Hamming window whose cutoff freq is 1.2 rad/s and length of window N=9. Assume necessary data [8+8]

5.a) What is the importance of Multirate Signal Processing and hence define Decimation and Interpolation.
b) Discuss the process of decimation with a neat block diagram and explain how the aliasing effect can be avoided. [8+8]

6.a) Discuss the internal architecture of a TMS 320C54xx Digital signal processor
b) Explain six stage pipeline architecture of TMS320C54xx processor. [8+8]

7.a) Discuss in detail about various basic discrete time signals.
b) A discrete time system is represented by the difference equations in which x(n) is the input and y(n) is the output, given by y(n) = x(n+1)-3x(n)+x(n-1); $n \geq 0$ & y(n) = 0, $n < 0$.
Check whether the system defined above is linear, time invariant and causal or not. [8+8]

8.a) Define DFT and IDFT. Compute the DFT of the given time domain sequence
x(n) = { 1,2,3,4,4,3,2,1}.
b) State and Prove Linearity, Time Invariant, Frequency shift and Time shift properties of DFT. [8+8]

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Code.No: **R05311101** | **R05** | **SET-3**

III B.TECH – I SEM EXAMINATIONS, NOVEMBER – 2010
DIGITAL SIGNAL PROCESSING
(COMMON TO BME, ECC)

Time: 3hours **Max.Marks:80**

Answer any FIVE questions
All questions carry equal marks

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1.a) Compare and Contrast Bilinear & Impulse Invariant transformation technique
b) Design a Digital Butterworth LPF using Bilinear transformation technique for the following specifications

$0.707 \leq |H(w)| \leq 1 \quad ; 0 \leq w \leq 0.2\pi$
$|H(w)| \leq 0.08 \; ; 0.4\pi \leq w \leq \pi$ [8+8]

2.a) Bring out the Comparison between FIR and IIR Filters.
b) Design an FIR Digital Low pass filter using Hamming window whose cutoff freq is 1.2 rad/s and length of window N=9. Assume necessary data [8+8]

3.a) What is the importance of Multirate Signal Processing and hence define Decimation and Interpolation.
b) Discuss the process of decimation with a neat block diagram and explain how the aliasing effect can be avoided. [8+8]

4.a) Discuss the internal architecture of a TMS 320C54xx Digital signal processor
b) Explain six stage pipeline architecture of TMS320C54xx processor. [8+8]

5.a) Discuss in detail about various basic discrete time signals.
b) A discrete time system is represented by the difference equations in which x(n) is the input and y(n) is the output, given by $y(n) = x(n+1)-3x(n)+x(n-1)$; $n \geq 0$ & $y(n) = 0$, $n<0$.
Check whether the system defined above is linear, time invariant and causal or not. [8+8]

6.a) Define DFT and IDFT. Compute the DFT of the given time domain sequence $x(n) = \{1,2,3,4,4,3,2,1\}$.
b) State and Prove Linearity, Time Invariant, Frequency shift and Time shift properties of DFT. [8+8]

7.a) Compute FFT of the given sequence $x(n) = \{8, 3, 5, 6, 7, 8, 4, 5\}$ using Radix-2 DIT FFT Algorithm.
b) Compare the computational complexity of DFT and FFT. [8+8]

8.a) Define Z- Transform. Determine the impulse response for the system given by the difference equation $y(n) = x(n)+3x(n-1)-4x(n-2)+2x(n-3)$.
b) Obtain the Parallel and Cascade form realization of the given LTI system governed by the difference equation
$y(n) = -3/8\, Y(n-1) + 3/32\, y(n-2) + 1/64\, y(n-3) + x(n) + 3\, x(n-1) + 2\, x(n-2)$. [8+8]

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Code.No: **R05311101** | **R05** | **SET-4**

III B.TECH – I SEM EXAMINATIONS, NOVEMBER – 2010
DIGITAL SIGNAL PROCESSING
(COMMON TO BME, ECC)

Time: 3hours **Max.Marks:80**

Answer any FIVE questions
All questions carry equal marks

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1.a) What is the importance of Multirate Signal Processing and hence define Decimation and Interpolation.
b) Discuss the process of decimation with a neat block diagram and explain how the aliasing effect can be avoided. [8+8]

2.a) Discuss the internal architecture of a TMS 320C54xx Digital signal processor
b) Explain six stage pipeline architecture of TMS320C54xx processor. [8+8]

3.a) Discuss in detail about various basic discrete time signals.
b) A discrete time system is represented by the difference equations in which x(n) is the input and y(n) is the output, given by $y(n) = x(n+1)-3x(n)+x(n-1)$; $n \geq 0$ & $y(n) = 0$, $n<0$.
Check whether the system defined above is linear, time invariant and causal or not. [8+8]

4.a) Define DFT and IDFT. Compute the DFT of the given time domain sequence $x(n) = \{1,2,3,4,4,3,2,1\}$.
b) State and Prove Linearity, Time Invariant, Frequency shift and Time shift properties of DFT. [8+8]

5.a) Compute FFT of the given sequence $x(n) = \{8, 3, 5, 6, 7, 8, 4, 5\}$ using Radix-2 DIT FFT Algorithm.
b) Compare the computational complexity of DFT and FFT. [8+8]

6.a) Define Z- Transform. Determine the impulse response for the system given by the difference equation $y(n) = x(n)+3x(n-1)-4x(n-2)+2x(n-3)$.
b) Obtain the Parallel and Cascade form realization of the given LTI system governed by the difference equation
$y(n) = -3/8\ Y(n-1) + 3/32\ y(n-2) + 1/64\ y(n-3) + x(n) + 3\ x(n-1) + 2\ x(n-2)$. [8+8]

7.a) Compare and Contrast Bilinear & Impulse Invariant transformation technique
b) Design a Digital Butterworth LPF using Bilinear transformation technique for the following specifications
$0.707 \leq |H(w)| \leq 1 \quad ; 0 \leq w \leq 0.2\pi$
$|H(w)| \leq 0.08 \ ; 0.4\pi \leq w \leq \pi$ [8+8]

8.a) Bring out the Comparison between FIR and IIR Filters.
b) Design an FIR Digital Low pass filter using Hamming window whose cutoff freq is 1.2 rad/s and length of window N=9. Assume necessary data [8+8]

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