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R16

Code No: 136BE

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year II Semester Examinations, November/December - 2020

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Time: 2 hours

Max. Marks: 75

Answer any five questions  
All questions carry equal marks

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- 1.a) What are the properties of LTI system? Explain them.  
b) Find the impulse response of the system described by the following difference equation: Assume all initial conditions are zero. [7+8]  
 $y(n)-2y(n-1)+4y(n-2)=x(n)+x(n-1)$

- 2.a) Realize the following system with minimum number of multipliers.

$$H(Z) = 0.5 + 0.75Z^{-1} + 0.8Z^{-2} + 0.9Z^{-3} + 2Z^{-4} + 0.9Z^{-5}$$

- b) Check  $y(n) = 3x(n-2) + 3x(n+2)$  is a causal linear system. [9+6]

- 3.a) Determine the DFT of a sequence  $X(n) = \{1, 1, 0, 0\}$ .

- b) Prove time shifting and frequency shifting properties of discrete fourier transform. [8+7]

- 4.a) Determine DFT of the sequence  $x(n) = \{1, 0, 0, 0\}$  using FFT algorithm.

- b) Determine the 4 - point IDFT of the sequence  $x[k] = \{1, -j, 0, j\}$  using DIT - FFT algorithm. [8+7]

- 5.a) Discuss magnitude characteristics of an analog Butterworth filter and give its pole locations.

- b) Find  $H(z)$  using impulse invariant method for given analog system: [7+8]  
 $H(s) = 1/(S + 0.5)(S^2 + 0.5S + 2)$

- 6.a) Describe the IIR filter design approximation using Bilinear transformation method.

- b) Differentiate between Butterworth and Chebyshier filter method. [9+6]

- 7.a) Outline the steps involved in the design of FIR filter using Hanning window.

- b) Write the magnitude and phase functions of FIR filter when impulse response is symmetric and N is odd. [8+7]

- 8.a) Explain about the Fixed-Point Quantization Errors and Floating Point Quantization errors.

- b) Explain in detail about Interpolation and decimation with examples. [7+8]

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