

Code No: 127CK

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year I Semester Examinations, October/November - 2020

DIGITAL SIGNAL PROCESSING

(Electrical and Electronics Engineering)

Time: 2 Hours

Max. Marks: 75

Answer any Five Questions
All Questions Carry Equal Marks

- 1.a) Check whether the following systems are stable, causal.
 i) $h(t) = te^{at} u(t)$ ii) $h(n) = e^{n/2} u(n-4)$
- b) Obtain the direct form-II realization for the given system. [7+8]
 $y(n) = -0.1y(n-1) + 0.72y(n-2) + 0.7x(n) - 0.252x(n-2)$
- 2.a) Test if the following system is linear time invariant or not.
 $y(n) = Ax(n) + B$
- b) A system is described by the difference equation $y(n)-y(n-1)-y(n-2) = x(n-1)$. Assuming that the system is initially relaxed, determine its unit sample response $h(n)$. [7+8]
- 3.a) Differentiate between Over-Lap save and Over-Lap Add method.
 b) Write any five properties of DFT. [7+8]
4. Find the 8-point DFT of $\{2, 1, 2, 1\}$ using DIF-FFT. Draw the signal flow graph for $N=8$ with intermediate values. [15]
- 5.a) Compare Butterworth and Chebyshev filters.
 b) Discuss impulse invariance method of IIR filter design. What are its disadvantages? [7+8]
- 6.a) Write the transfer function of unnormalized butterworth low pass filter.
 b) Discuss the digital frequency transformation. [7+8]
7. Design a FIR digital low-pass filter with a cutoff frequency of 1 kHz and a sampling rate of 4 kHz with 7 samples using Fourier series method. [15]
- 8.a) Explain how reduction of product round-off error is achieved in digital filters. [7+8]
 b) Discuss the sampling rate conversion by a factor I with the help of a neat block diagram.

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