Code No: 137BX

R16

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech IV Year I Semester Examinations, March - 2021
DIGITAL SIGNAL PROCESSING
(Electrical and Electronics Engineering)

Time: 3 Hours **Max. Marks: 75**

Answer any Five Questions
All Questions Carry Equal Marks

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1.a) Test if the following system is linear time invariant or not.
$y(n) = Ax(n) + B$
b) Distinguish between i) Stable and Unstable system ii) Causal and Non-causal Systems. [7+8]

2.a) Determine the transfer function H (Z) of the system given by
$y(n-1) + 5\,y(n) = 4\,x(n) + 5\,x(n-1) + 6\,x(n-2)$
b) Find the Z-Transform of: i) $\delta(n)$ ii) $u(n)$. [7+8]

3.a) Compute eight point FFT for x(n)={1,2,2,1,1,2,1,1} using decimation in time FFT Algorithm.
b) Discuss the relation between DFT and Z-transform. [8+7]

4.a) State and prove any 4 properties of Discrete Fourier Transform.
b) Determine the 8 point IDFT of the sequence
x(n) = {5,0,1,-j,0,1,0,1+j,0}. [7+8]

5.a) Realize the IIR filter
$$H(z) = \frac{3z^2 + 5z + 4}{z^2 + 6z + 8}$$
b) Based on frequency response how are filters classified elaborate. [7+8]

6.a) Find the frequency response of a rectangular window.
b) What is an FIR filter? Compare an FIR filter with an IIR filter. [7+8]

7.a) Compare impulse invariant and bilinear transformation methods.
b) What is frequency warping? How it will arise? [7+8]

8.a) What are the different methods used to prevent overflow? Explain.
b) Discuss the Practical application of Multi-rate digital signal processing in daily life. [7+8]

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