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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST - 2 EXAMINATION OCTOBER 2018

B.Tech V Semester

Dr. Nafis U. Khan

COURSE CODE: 10B11EC512

MAX. MARKS: 25

COURSE NAME: Digital Signal Processing

COURSE CREDITS: 04

MAX. TIME: 1.5 Hr

Note: All questions are compulsory. Assume the data wherever necessary.

- Q1. (a) Explain the use of DFT as a linear filtering tool in digital signal processing.
(b) Determine the IDFT of $X[k] = \{2, 1 + j, 0, 1 - j\}$ CO2 [3+2]
- Q2. Compute circular convolution of the following sequences:
 $x_1[n] = \{1, 2, 0, 1\}$
 $x_2[n] = \{2, 2, 1, 1\}$ CO2 [5]
- Q3. (a) Explain the significance of FFT algorithm. Using butterfly diagram, determine the computational complexity of N - point DFT in radix-2 FFT algorithm.
(b) Determine 4 - point DFT of the signal $x[n] = \sin\left(\frac{n\pi}{4}\right)$ using radix - 2 DIF FFT algorithm. CO2 [3+2]
- Q4. Draw the cascade and parallel realization for the following system function: CO3 [5]
- $$H(z) = \frac{1 + \frac{1}{4}z^{-1}}{\left(1 + \frac{1}{2}z^{-1}\right)\left(1 + \frac{1}{2}z^{-1} + \frac{1}{4}z^{-2}\right)}$$
- Q5. Explain in detail any one of the following: CO3 [5]
(a) Frequency Domain Sampling
(b) Goertzel Algorithm
(c) Chirp - Z transform