Sardar Patel Institute of Technology

Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058-India
(Autonomous Institute Affiliated to University of Mumbai)

Mid Semester Examination
October 2022

Max. Marks: 20 | **Duration: 60 min**
Class: T.E. | **Semester: V**
Course Code: EC/ET303 | **Branch: EXTC/ETRX**
Name of the Course: Digital Signal Processing

Instructions:

(1) All Questions are Compulsory and must be solved in the order. Solving randomly may result in penalty. No marks will be given to answer without question number.
(2) Draw neat and clear diagrams. Units must be mentioned wherever necessary.
(3) Use your own UCID number as data wherever asked in the questions.

Question No.		Max. Marks	CO	BL
Q1	If $x(n) = 0$ for $n < 0$, derive an expression for $x(n)$ in terms of its even part, $x_e(n)$, and using this expression, find $x(n)$ when $x_e(n) = (0.9)^{\|n\|}u(n)$.	04	CO1	L2
Q2	Evaluate 8-point DFT X(k) using DIF-FFT for the following discrete signal sequence $x(n) = \{1, 1, 1, 1, 0, 1, 1, 1\}$. a) Identify the DFT property and not otherwise find DFT $X_1(k)$ for $x_1(n) = \{1, 1, 1, 1, 1, 1, 1, 0\}$ b) Perform circular cross correlation y(n) of the following sequence x(n) and $x_1(n)$.	08	CO2	L4
Q3	Illustrate Linear Filtering of the following sequences $x(n) = \{2, 1, -1, -2, -3, 5, 6, -1, 2, 0, 2, 1\}$ and $h(n) = \{3, 2, 1\}$ using overlap – save method. Use only 8-point DIT-FFT circular convolution approach.	08	CO2	L3