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Examination: Odd Semester Examination 2024 (Backlog)

Paper Name: Digital Signal Processing
Time: 2.5 Hours

Paper Code: BTECE-504/ BTECE-504-LE
Maximum Marks: 60

Section A

Note: Attempt all the questions. Each question carries equal marks.

(7x5=35)

Q. No.	Question	Marks	CO	BL
1.	Evaluate energy and power of unit step sequence.	5	CO1	BL5
2.	Obtain the linear-phase structure for the linear-phase FIR system given by $H(z) = 1 + (1/2).z^{-1} + (1/3).z^{-2} + (1/6).z^{-3} + (1/3).z^{-4} + (1/2).z^{-5} + z^{-6}$	5	CO3	BL4
3.	Describe any four properties of DFT (Discrete Fourier Transform).	5	CO2	BL2
4.	An LTI system is described by the difference equation $y(n) = a_1.y(n-1) + x(n) + b_1 x(n-1)$. Realize it in direct form-I structure and convert it into direct form-II structure.	5	CO4	BL5
5.	Differentiate between FIR and IIR filter.	5	CO5	BL4
6.	Describe any two-windowing function in brief.	5	CO4	BL2
7.	Evaluate z-transform of unit impulse and unit step sequence.	5	CO3	BL5

Section B

Note: Attempt any four (4) Questions. Each question carries equal marks.

(4x10=40)

Q. No.	Question	Marks	CO	BL
1.	Evaluate circular convolution of the following sequences: (a) $x_1(n) = \{1 \ 2 \ 2 \ 3\}$ and $h_1(n) = \{3 \ 2 \ 3 \ 4\}$ (b) $x_2(n) = \{1 \ 1 \ 3 \ 2\}$ and $h_2(n) = \{1 \ 2 \ 1 \ 3\}$	10	CO2	BL5
2.	Explain Properties of Z-transform.	10	CO2	BL2

3.	Describe parametric and non-parametric spectral estimation techniques.	10	CO5	BL4
4.	For the transfer function $H(s) = 1/(s^2 + \sqrt{2}s + 1)$ find the corresponding system function $H(z)$.	10	CO4	BL6
5.	A low pass digital filter is specified by the following relative specification: $\omega_p = 0.3\pi$, $A_p = 0.1$ dB, $\omega_s = 0.5\pi$, and $A_s = 35$ dB. Determine the absolute specifications: δ_p and δ_s .	10	CO3	BL5
6.	Write a short note on any two of the followings: a. Quantization b. Application of DSP processors c. Low pass filter specifications	10	CO4, CO5	BL2

BL: Blooms Taxonomy Level; (1-remembering, 2-understanding, 3-apply, 4-analyse, 5- evaluate, 6-create)