CLASS: BTECH   SEMESTER : V
BRANCH: ECE   SESSION : MO/2024

SUBJECT: EC305 SIGNAL PROCESSING TECHNIQUES
TIME: 02 Hours   FULL MARKS: 25

INSTRUCTIONS:
1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates

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			CO	BL
Q.1(a)	Sketch the pole-zero plot of the system $H(z) = \frac{z^2+0.25}{(z-0.5)(z^2+3z+2.5)}$ and comment on its stability.	[2]	CO2	BL3
Q.1(b)	Describe the minimum phase and maximum phase DSP system with example.	[3]	CO1	BL1
Q.2(a)	Compare Z-transform with Fourier transform.	[2]	CO2	BL2
Q.2(b)	Using partial fraction expansion, find the inverse Z-transform of the signal $X(z) = \frac{1}{1+3z^{-1}+2z^{-2}}$ ROC: $|z| > 2$	[3]	CO1	BL1
Q.3(a)	Compute the periodic convolution of the sequence $x_1(n) = \{1,2,2,1\}$ and $x_2(n) = \{2,1,1,2\}$	[2]	CO1	BL3
Q.3(b)	Find the 4-point DFT of the sequence $x(n) = \{1,2,3,4\}$ using decimation in time FFT method.	[3]	CO1	BL1
Q.4(a)	Obtain the direct form-II structure of the discrete time system defined as $y(n) = -0.2y(n-1) + 0.6y(n-2) + 0.4x(n) - 0.12x(n-2)$	[2]	CO2	BL3
Q.4(b)	Realize the cascade structure of the discrete time causal system $H(z) = \frac{0.5(1-z^{-2})}{1+1.3z^{-1}+0.36z^{-2}}$	[3]	CO2	BL3
Q.5(a)	Explain the effect of truncation and rounding quantization in DSP system design.	[2]	CO2	BL2
Q.5(b)	Compare the explicit and implicit floating-point representation. Represent the real number 37.625 in 12-bit floating point representation in implicit normalization.	[3]	CO2	BL2

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