PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)
MSc DEGREE EXAMINATION MAY 2025
(Fourth Semester)
Branch – APPLIED ELECTRONICS
DIGITAL SIGNAL PROCESSING

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)
Answer ALL questions

ALL questions carry EQUAL marks   (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	In real valued function and complex valued function, time is _____ a) Real b) Complex c) Imaginary d) Not predictable	K1	CO1
	2	Discrete-time signals are _____ a) Continuous in amplitude and time b) Continuous in amplitude and discrete in time c) Discrete in amplitude and discrete in time d) Discrete in amplitude and continuous in time	K2	CO1
2	3	The Z transform of $\delta(n-m)$ is _____ a) z^{n} b) z^{-m} c) $\frac{1}{z-n}$ d) $\frac{1}{z-m}$	K1	CO2
	4	If G(f) represents the Fourier Transform of a signal g (t) which is real and odd symmetric in time, then G (f) is _____ a) Complex b) Imaginary c) Real d) Real and non- negative	K2	CO2
3	5	Which of the following represents the bandwidth of the filter? a) $\omega_{P}+\omega_{S}$ b) $-\omega_{P}+\omega_{S}$ c) $\omega_{P}-\omega_{S}$ d) None	K1	CO3
	6	Which of the following condition should the unit sample response of a FIR filter satisfy to have a linear phase? a) h(M-1-n) n=0,1,2...M-1 b) ±h(M-1-n) n=0,1,2...M-1 c) -h(M-1-n) n=0,1,2...M-1 d) None of the mentioned	K2	CO3
4	7	Parallel form of realization is done in _____ a) High speed filtering applications b) Low speed filtering applications c) Both a and b d) None of the above	K1	CO4
	8	The cascade realisation of IIR systems involves_____ . 1) The transfer function broken into product of transfer functions 2) The transfer function divided into addition of transfer functions 3) Factoring the numerator and denominator polynomials 4) Derivatives of the transfer functions a) 1, 2 and 3 are correct b) 1 and 3 are correct c) 3 and 4 are correct d) all the four are correct	K2	CO4
5	9	DSP algorithms are applied to speech signals for tasks like _____ a) speech recognition b) synthesis c) enhancement d) all of the above	K1	CO5
	10	In Homomorphic filtering which of the following operations is used to convert input image to discrete Fourier transformed function? a) Logarithmic b) Exponential c) Negative transformation d) None	K2	CO5

SECTION - B (35 Marks)
Answer ALL questions
ALL questions carry EQUAL Marks   (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Classify the various types of signals with neat sketch.	K4	CO1
		(OR)		
	11.b.	Examine the interconnection of LTT systems in detail.		
2	12.a.	Compare the linear and circular convolutions and list down the differences.	K4	CO2
		(OR)		
	12.b.	Analyze the operation of cross correlation with and example and explain.		
3	13.a.	Explain the working of simple IIR digital filters with diagrams.	K5	CO3
		(OR)		
	13.b.	Compare IIR and FIR filters.		
4	14.a.	Explain in detail about direct form I realization.	K5	CO4
		(OR)		
	14.b.	Evaluate the concept of polyphasic realization with an example.		
5	15.a.	Elaborate in detail about the speech processing.	K6	CO5
		(OR)		
	15.b.	Discuss in depth about the digital processing of audio signals.		

SECTION -C (30 Marks)
Answer ANY THREE questions
ALL questions carry EQUAL Marks   (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Classify the discrete time systems and explain it.	K4	CO1
2	17	Distinguish between DFT and FFT algorithms.	K4	CO2
3	18	Explain the design of FIR filters using windowing.	K5	CO3
4	19	Prove the importance of lattice ladder structure in realization of IIR digital filters.	K5	CO4
5	20	Discuss in detail about the Homomorphic Vocoder.	K6	CO5

Z-Z-Z   END